MAY, 1948

Railway Engineering and Maintenance

HEADFREE JOINTS

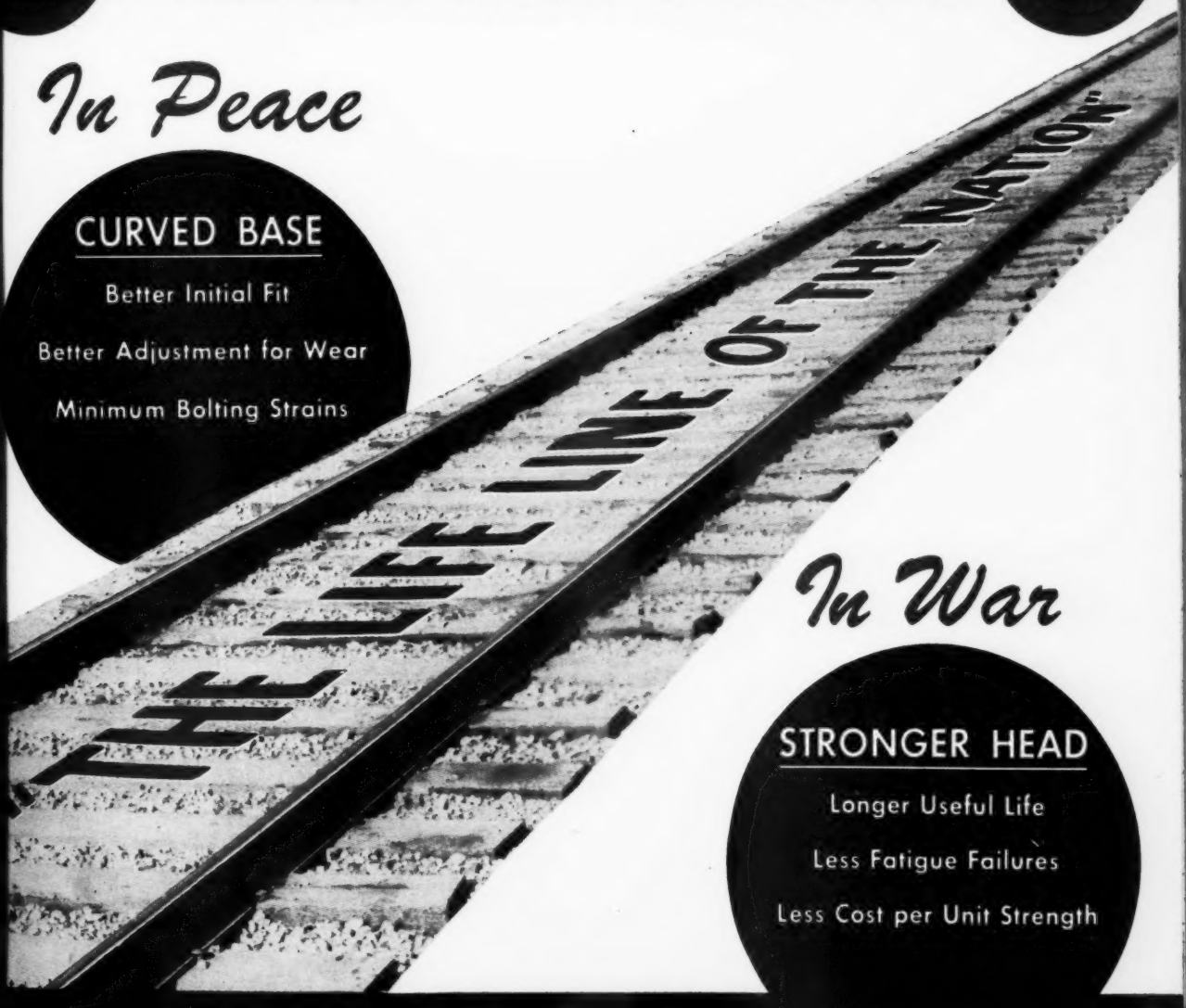
In Peace

CURVED BASE

Better Initial Fit

Better Adjustment for Wear

Minimum Bolting Strains



In War

STRONGER HEAD

Longer Useful Life

Less Fatigue Failures

Less Cost per Unit Strength

RAIL JOINT COMPANY, INC.

PITTSBURGH ... NEW YORK ...

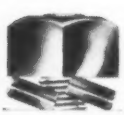
Here's the new Reliance Xtra-hy hy-crome Spring Washer

Xtra-hy hy-crome FACTS

1" bolt size

fully compressed 20,000 pounds

Reactive Pressure at .030" release (approx. 1/4 back turn of nut) average 5500 pounds



Reactive Range — full release—No increase in bolt length required and properly fits the angle bar if Reliance Hy-Pressure Hy-Crome was previously used

...keeps track joint bolts tighter longer

The Reliance Xtra-hy Hy-Crome Spring Washer for 1" bolt thread diameter was developed to meet the new A.R.E.A. specification. Present Reliance Hy-Crome Spring Washers adequately meet these specifications for other bolt thread diameters.

The Xtra-hy Hy-Crome Spring Washer is made of special analysis cold-drawn alloy steel. It exceeds the new A.R.E.A. specification requirements by a safe, adequate margin and possesses reactive pressure and sufficient range of recovery from compression to flat to automatically compensate for the effect of loose bolt tension resulting from dimensional changes of the assembly parts. The Xtra-hy Hy-Crome Spring Washer provides minimum permanent set and maximum uniformity and serviceability.

Information on new Reliance Xtra-hy Hy-Crome Spring Washers will be sent upon request.

Reliance Xtra-hy hy-crome spring washers

EATON

EATON MANUFACTURING COMPANY

OFFICES AND PLANT MASSILLON, OHIO

Sales Offices: New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal

You can retain the safety factor originally designed in your bridges

Girder bridges, coated entirely with NO-OX-ID, are more economically and effectively protected to retain that reserve of safety provided in the original design. Where NO-OX-ID coating is used, corrosion cannot start. Vulnerable areas, usually horizontal surfaces, that receive and hold live coal cinders, brine, etc., are adequately protected with only one coat. Time is saved when applying NO-OX-ID as the steel surface does not have to be thoroughly precleaned.

NO-OX-ID is effective

Why spend more when the job can be done effectively and economically through the use of NO-OX-ID, and the reserve of safety wholly retained. A railroad, located largely along the sea coast, reported complete protection of steel structures with NO-OX-ID, and no loss of metal. This result was accomplished at one-sixth of former outlay using so-called traditional standard materials. You can have these results on your railway. Write for complete information on bridge protection the NO-OX-ID way.

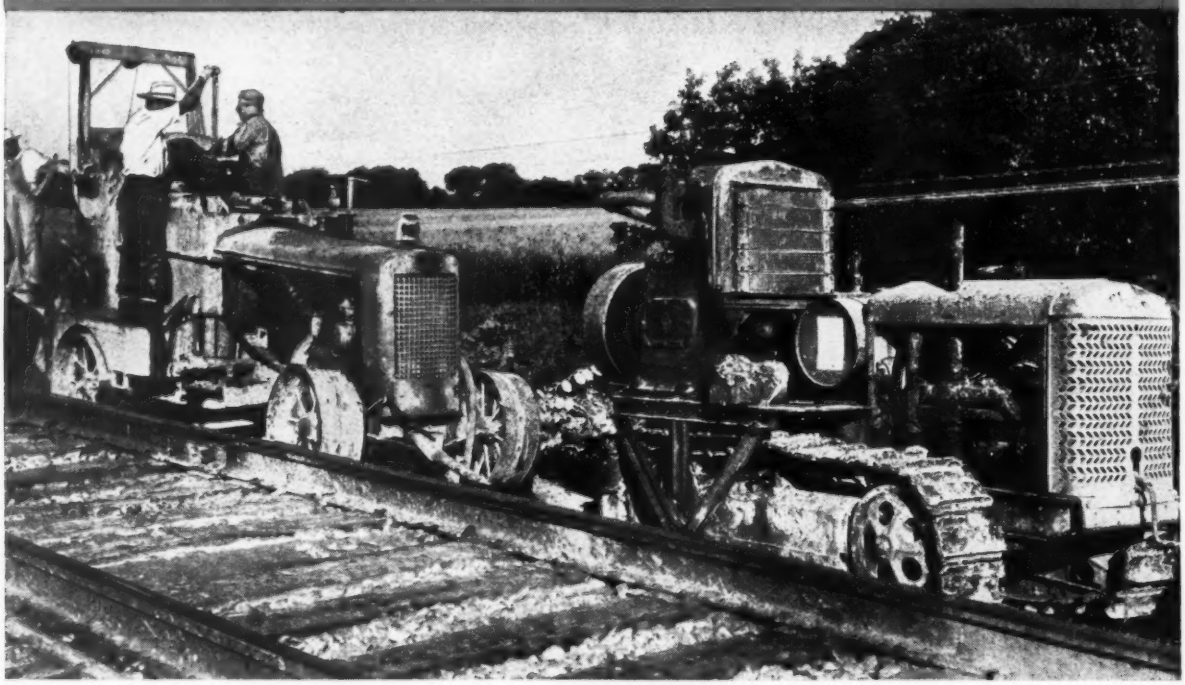
(Photographs used here through the courtesy of Southern Pacific Railroad.)

The ORIGINAL RUST PREVENTIVE

Dearborn Chemical Company
Dept. U, 310 S. Michigan Ave., Chicago 4, Ill.
New York • Los Angeles • Toronto

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.

Better Stabilization AT LOWER COST

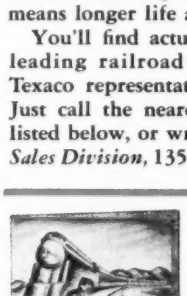


The Texaco method of asphalt-cement pressure grouting assures 3 worthwhile savings

WHEN you stabilize your soft track with the Texaco method of asphalt-cement pressure grouting, you (1) save on the initial cost of the stabilization; (2) save on subsequent track maintenance; and (3) save the expense of slow orders and other traffic delays.

Small quantities of *Texaco No. 24 Emulsified Asphalt* added to ordinary cement-and-sand grout encourage it to flow more easily, penetrate better and seal more thoroughly. Result is easier and quicker stabilization. And the ability of this fine asphalt (developed especially for grouting) to waterproof the soil and keep it stable without loss of resiliency means longer life and lower maintenance costs.

You'll find actual figures on savings made by a leading railroad in the book shown below. A Texaco representative will gladly give you others. Just call the nearest Railway Sales Division office listed below, or write The Texas Company, *Railway Sales Division*, 135 East 42nd St., New York 17, N. Y.



SEND FOR this fact-packed, 16-page, illustrated book. Describes the development of asphalt-cement pressure grouting, outlines a practical working set-up, shows costs, and benefits secured by a leading railroad.

NEW YORK • CHICAGO • SAN FRANCISCO • ST. PAUL • ST. LOUIS • ATLANTA

TEXACO

TEXACO Emulsified Asphalt FOR GROUTING

TUNE IN . . . TEXACO STAR THEATRE every Wednesday night featuring Gordon MacRae and Evelyn Knight . . . ABC Network

Faster on those everyday maintenance problems!

A Northwest Crawler Crane can be put on the job faster. It loads and unloads under its own power on a standard flatcar or trailer and it can be used either on the line or off the line, or it will operate from the car itself.

It is convertible from a standard Shovel to a Crane or Dragline by simply changing booms, giving you the choice of the most efficient machine for the problem.

Such features as the Northwest Dual Independent Crowd, that utilizes force other shovels waste; the Cushion Clutch Northwest Uniform Pressure Swing Clutches; Northwest simplicity of design, that makes upkeep easy; and the safety of the "Feather-Touch" Clutch Control, that assures the absolute impossibility of shutdown due to control failure; combine for faster handling of your maintenance-of-way problems from widening right-of-way to trimming banks.

Let us tell you more about it. Northwest does things no track type machine can do.

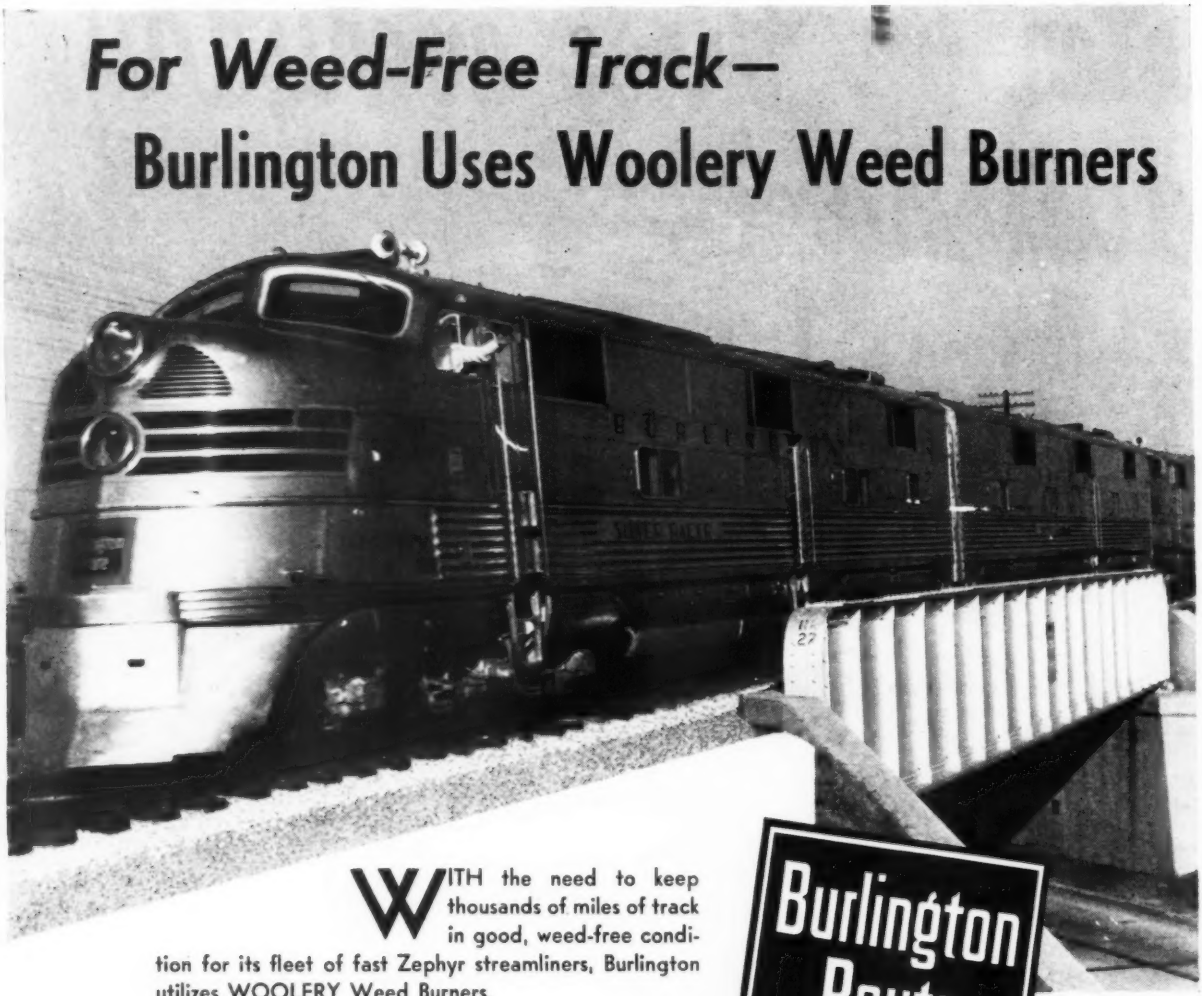
NORTHWEST ENGINEERING COMPANY
1513 Field Bldg., 135 S. LaSalle St., Chicago 3, Ill.

NORTHWEST

E ALL PURPOSE RAILROAD MACHINE
OVEL • CRANE • DRAGLINE • PULLSHOVEL

Proved on the Nation's Leading Railways

For Weed-Free Track—
Burlington Uses Woolery Weed Burners



WITH the need to keep thousands of miles of track in good, weed-free condition for its fleet of fast Zephyr streamliners, Burlington utilizes WOOLERY Weed Burners.

Burlington Route

The effective destruction of road-bed vegetation with WOOLERY Weed Burners facilitates drainage, increases the life of ties, reduces fouling of the ballast, and minimizes the slipping of locomotive drive wheels.

Doing a thorough job economically, WOOLERY Weed Burners, Tie Cutters, and Creosote Sprayers are in use on more than 75 American railroads. Write us for complete information.

Woolery 5-burner in action

WOOLERY WEED BURNERS

Available in 5-burner, 3-burner, 2-burner, 1-burner models.

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

RAILWAY MAINTENANCE EQUIPMENT

RAILWAY WEED BURNERS • MOTOR CARS • TIE CUTTERS • TIE SCORING MACHINES • RAIL JOINT OILERS • CREOSOTE SPRAYERS • BOLT TIGHTENERS

EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., PITTSBURGH, PENNA.

For additional information, use postcard, pages 539-540

Don't 'Ride' Em out of town on a Rail'

Use P&H welding electrodes to smooth out your trackwork and build passenger satisfaction

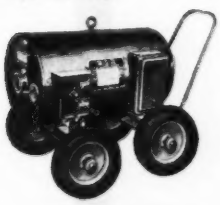
Smooth track also reduces equipment maintenance costs

In frontier days, being ridden out of town on a rail was rough punishment. People won't stand for it today. This is especially true of your passengers — they want comfort, speed, safety, and service.

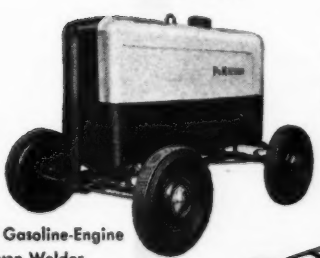
A quick, easy way to start providing comfort, speed, and safety is to build up battered rail ends, worn frogs, crossovers, etc., with P&H electrodes. You benefit two ways: Passengers are satisfied, and costs for equipment maintenance are reduced.

Here are two electrodes that are ideally suited for smoothing out your track and maintenance problems:

Build-up Weld on a Manganese Frog.



WSR 500 DC Welder
60 to 500 amps.



WN 300 Gasoline-Engine Driven Welder
30 to 375 amps.

Harcote 35 provides abrasion- and shock-resistant welds on high carbon steels — Because of the speed and ease with which this electrode can be applied to high carbon steels, it has become a great favorite with railroads throughout the country, for building up worn rail ends. It can be used on AC and DC welders, has a Brinell hardness of 375.

Harnimang A makes possible impact- and abrasion-resistant build-up welds on manganese steel. This nickel-manganese electrode gives you welds of high tensile strength and ductility. It work-hardens to 495 Brinell. That is why many railroads have found Harnimang A especially suitable for reclaiming frogs and other types of manganese steel trackwork. This electrode can also be used on either AC or DC current.

Yes, you can make things easier for your passengers, equipment, and work crews by maintaining your track with P&H electrodes. Let your nearest P&H representative show you why. Write us for latest bulletins.

P&H
HARNISCHFEGER CORPORATION

RAILROAD SALES DIVISION
4420 W. National Ave.
Milwaukee 14, Wis.

Additional P&H Railroad Equipment

Excavators

Overhead Traveling Cranes

Truck Cranes

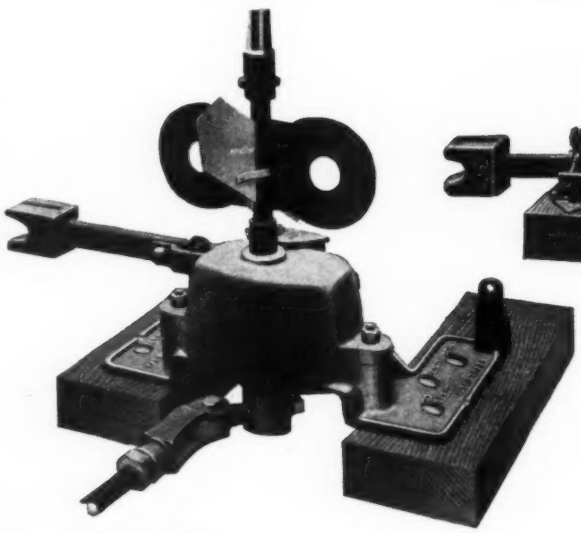
The "Royal Family" of SWITCH STANDS

Here are three members of a famous family—Bethlehem's New Century Switch Stand and two others almost as well known, the 53 and the 1222. All have a blue-ribbon background; all have proved their worth through the years.

Ask for full details of these and other Bethlehem stands. There's a Bethlehem model for every type of service.

THE NEW CENTURY For use with heavy rail (60-lb and over) in main-line, branch-line, and yard service. Parallel-throw lever. Convenient switch-point adjustment. Low and intermediate types.

THE MODEL 53. Simple, powerful, safe. Parallel-throw lever. Only 3 moving parts; stand operates on the sliding-block-and-crank principle. For main-line and heavy yard duty.



THE MODEL 1222. Another trouble-free stand using the sliding-block-and-crank device. Low, compact—ideal for confined locations. Parallel throw. For yard and certain kinds of main-line duty.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

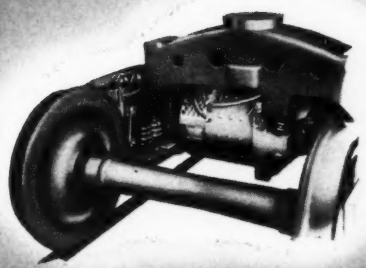
On the Pacific Coast Bethlehem products are sold by
Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

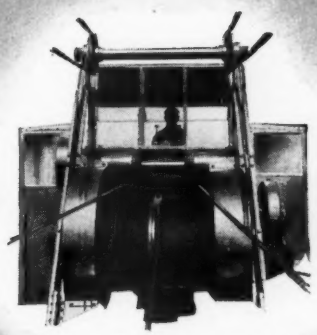
BROWNHOIST DIESEL ELECTRIC LOCOMOTIVE-CRANE

Sets a new high in crane efficiency and economy.

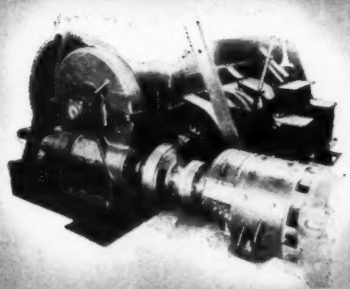
... AND HERE ARE 4 REASONS WHY



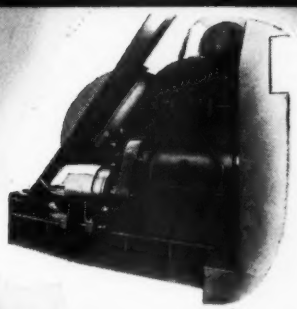
1 **Travel** clutches and complicated gearing have been eliminated by installing spring mounted motors inside the A.A.R. cast steel side frame trucks to supply travel power to axles.



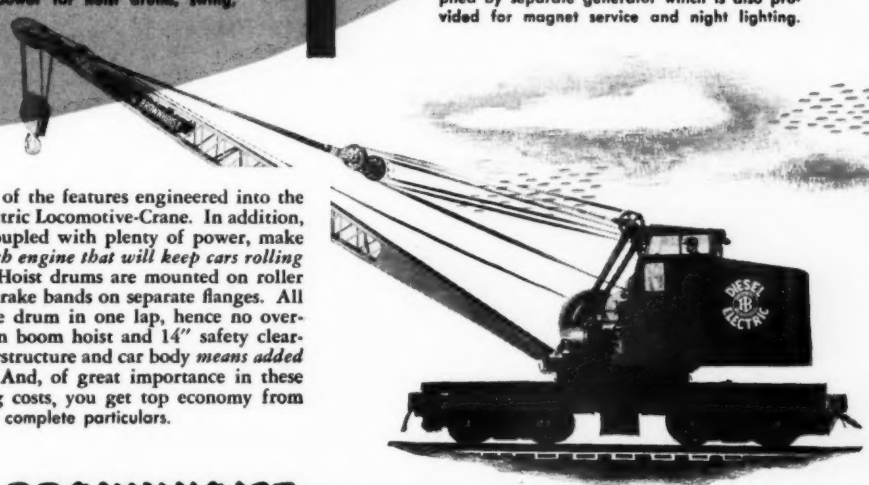
2 **Operator** in Monitor-type cab has 360° visibility and an unobstructed view of hoist and boom drums for faster, safer crane operation.



3 **Motor current** is provided by generator direct connected to diesel engine. Helical gear reducer supplies power for hoist drums, swing, and boom hoist.



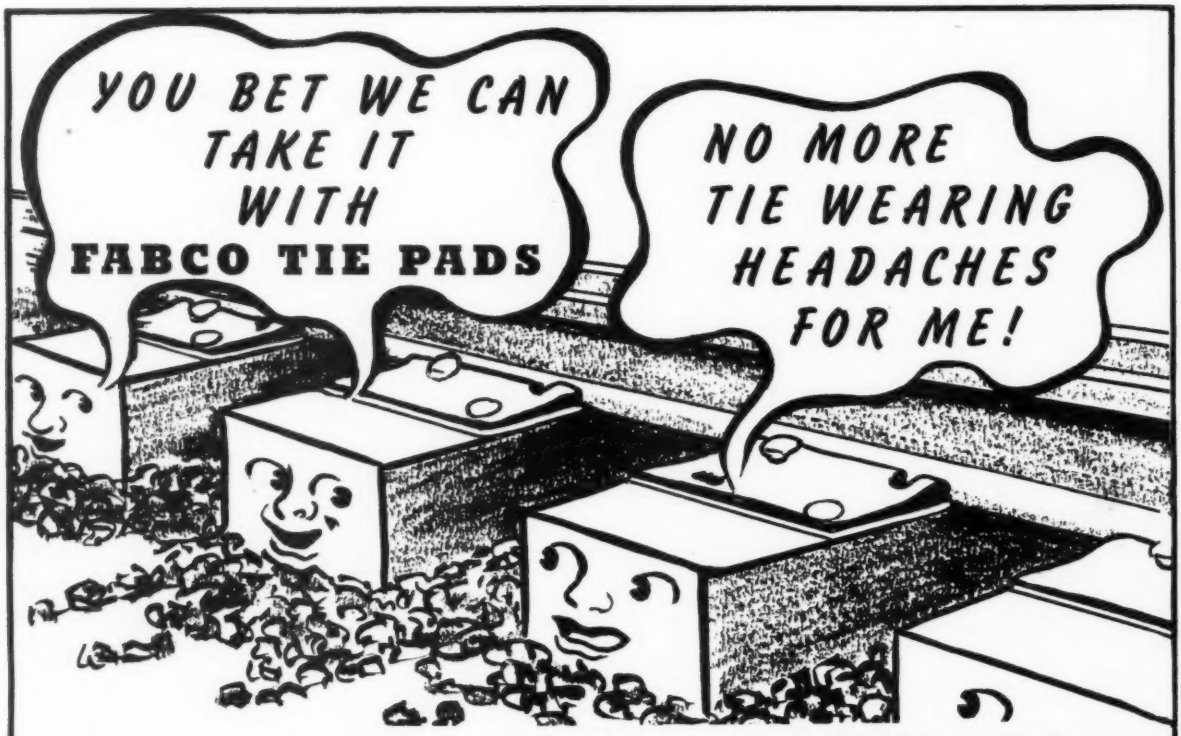
4 **Electric swing** is available, with power supplied by separate generator which is also provided for magnet service and night lighting.



Illustrated are only a few of the features engineered into the new Brownhoist Diesel Electric Locomotive-Crane. In addition, 15 M.P.H. travel speeds, coupled with plenty of power, make it a *quick-accelerating switch engine that will keep cars rolling* in and out of your yards. Hoist drums are mounted on roller bearings, with clutch and brake bands on separate flanges. All boom cable is taken on the drum in one lap, hence no overwinding. Safe worm driven boom hoist and 14" safety clearance between rotating superstructure and car body *means added safety for your workmen.* And, of great importance in these days of increased operating costs, you get top economy from cheap fuel. Write today for complete particulars.

BROWNHOIST BUILDS BETTER CRANES

INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICH. • **DISTRICT OFFICES:** NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO • **AGENCIES:** DETROIT, BIRMINGHAM, HOUSTON, LOS ANGELES, PORTLAND, SAN FRANCISCO, SEATTLE, SPOKANE, CANADIAN BROWNHOIST LTD., MONTREAL, QUEBEC.



Now We Can Keep Our NEW LOOK with

FABCO TIE PADS

After seven years of intensive development, FABCO Tie Pads to reduce the mechanical wear of ties in Open Track were made available in January of this year . . . at prices which definitely help reduce the final cost of the ties.

FABCO Tie Pads for Open Track are stocked in 1/4" thickness, in standard tie plate sizes: 7 3/4" x 12"; 7 3/4" x 13"; 7 3/4" x 14"; with other sizes available on special order. They withstand extremes of temperature, moisture, brine, mildew and sand . . . and their limited resiliency, without permanent set, means that spikes do not have to be driven down a second and third time.

- **Prevent Wear of Ties**
- **Resilient — no set — no loose spikes**
- **Long Life — no renewals required**

Get the facts about FABCO Tie Pads Today!

FABCO TIE PADS
Made by
The Makers of Fabreeka

FABREEKA PRODUCTS COMPANY Incorporated

222M Summer Street • Boston 10, Massachusetts

Here's the dirt on roadbeds...

and it's not good unless you get it out. The McWilliams "Mole" will clean your roadbeds for you quickly and efficiently. A crew of only four men can clean 850 to 1200 feet of shoulder in 8 hours with the shoulder model illustrated. Five men can do a similar job with the intertrack model.

RAILWAY MAINTENANCE CORP.

PITTSBURGH 30, PENNSYLVANIA

Put tomorrow's dreams on a solid foundation . . . with MONOTUBES

JOB-PROVED — economy-proved — quality-proved . . . that's Monotube tapered steel piles. And that's why so many construction projects *start* with Monotubes.

Experienced architects and builders have long depended upon them because—

Monotubes' fluted, tapered design speeds driving;

They are easily extendible, right on the job;

Their sturdy construction eliminates use of driving mandrel;

Light in weight, they are easily and quickly handled;

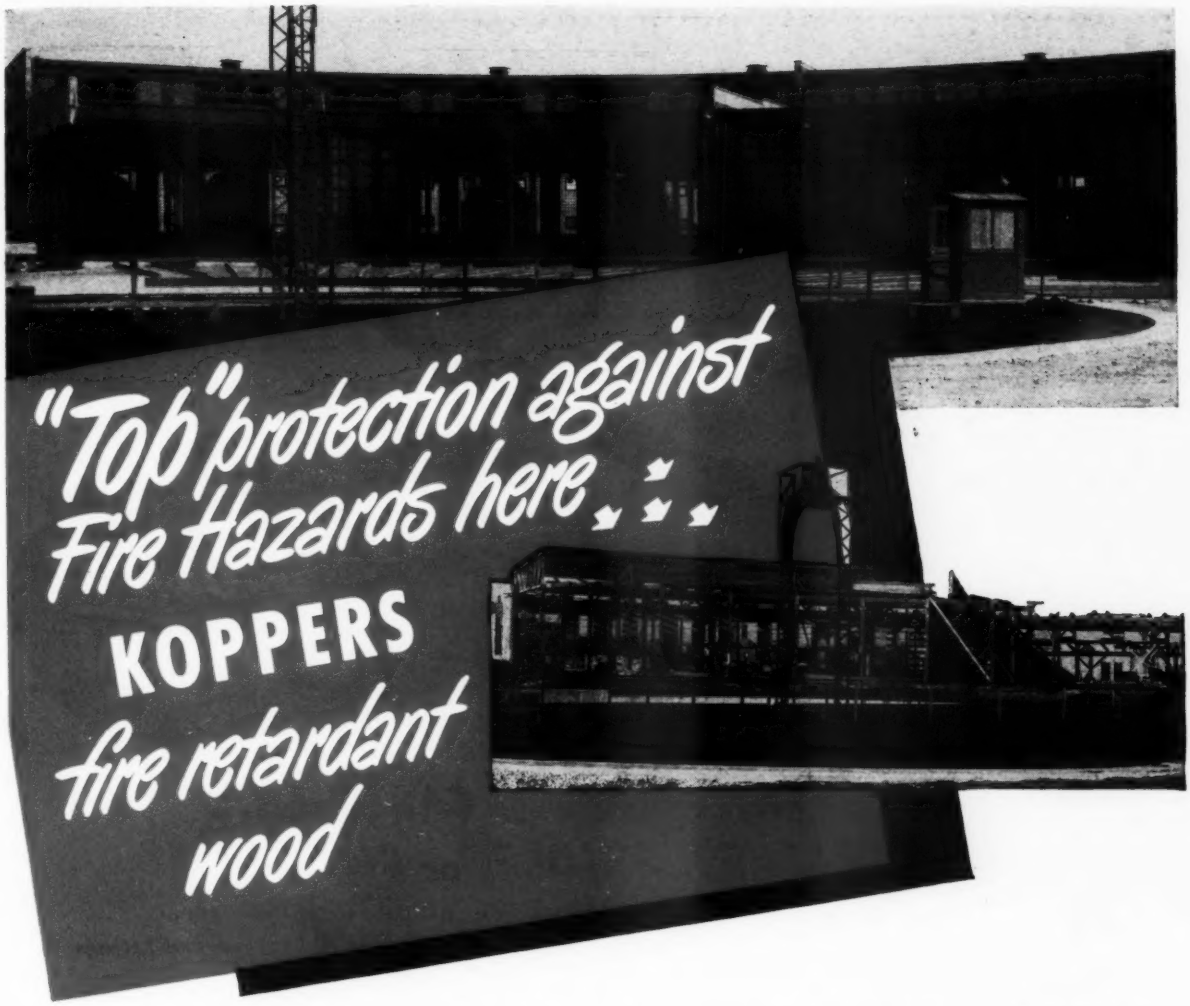
Monotubes' tubular construction makes inspection, before concreting, quick and easy.

Plan a solid foundation *now* for tomorrow's projects—buildings, piers, bridges, airports, highways — with *Monotubes.* They can make the time-and-cost-savings you want. Gauges, sizes and tapers to meet varying soil conditions. For complete information, write The Union Metal Manufacturing Co., Canton 5, Ohio.

We regret the present extended delivery schedules due to the steel shortage, but you will find Monotube Piles well worth waiting for.

UNION METAL

Monotube Foundation Piles



This engine house is part of a new terminal built by the Baltimore and Ohio Railroad at East St. Louis. Everything is completely modern and up-to-date . . . built for economy, efficiency and permanence. So what material was used for the roof trusses, purlins and roofing? *Koppers Fire-retardant wood, of course.*

Engineers are making extensive use of Koppers Fire-retardant wood, not only in engine houses where fire hazard is always present, but as an *extra measure of protection* in other structures as well. Effectiveness in retarding both the spread of flame and the generation of smoke and fumes has been dramatically confirmed in a number of fires in buildings where the material was used.

In one typical instance, a lacquer fire that warped and melted metal lighting fixtures was easily extinguished and produced only a shallow char in the wood, *insufficient to require any replacement.* Observers have agreed that the fire-retardant wood was responsible for preventing a disastrous fire, with possible complete loss of the building.

Koppers conveniently located plants are equipped to treat your lumber and timbers with CZC (FR) for fire retardance (this treatment also confers high resistance to decay and termites) or with any other recognized preservative. If desired, members can be preframed to blueprint, and delivered to you all ready for assembly on the job. Get full details—ask for new bulletin, just off the press, "Koppers Fire-Retardant Wood."

K
KOPPERS

PRESSURE-TREATED WOOD

KOPPERS COMPANY, INC.

PITTSBURGH 19, PENNSYLVANIA

ONE SLING ASSEMBLY *for* 16 DIFFERENT LOADS!

ACCO Registered "Make-Your-Own" WIRE ROPE SLINGS

1, 2, 3 or 4-LEG STRAND-LAID or CABLE-LAID BASKET, BRIDLE, or CHOKER

You can make as many as 16 different slings for 16 different loads from the parts of an ACCO Registered "Make-Your-Own" 4-leg Wire Rope Sling with ACCO special fittings

You carry sling units with standard Acco-Loc Safety Loops, and the necessary Acco links, shackles, and hooks. Parts are interchangeable. You can use one, two, or three of the four legs with or without fittings for basket, bridle, or choker hitches. One or two 4-leg Acco "*Make-Your-Own*" Slings frequently do the work of a dozen odd lengths and diameters of old-fashioned slings. And if you need only one or two legs, with or without fittings, that's all you buy.

Acco Registered Slings are proof-tested at the factory at twice their rated capacities. The fittings are tested, too, but at two and one-half times their rated capacities. Safety factor is 5 to 1 and the Registry Certificate warrants the rated capacity at that safety factor. The metal identification tag on each sling leg tells the rated capacity. There is no guesswork.

There's far too much to the full story of Acco Registered Slings to tell here. Call your mill supply house today—or write to the nearest Acco office listed below for a copy of the S-2 "*Make-Your-Own*" SLING folder. It tells all about Acco Registered Strand-Laid and Cable-Laid Slings. It contains the answer to a lot of complicated sling problems.

UNIVERSAL SAFETY

MEMBER THE NATIONAL SAFETY COUNCIL

ACCO

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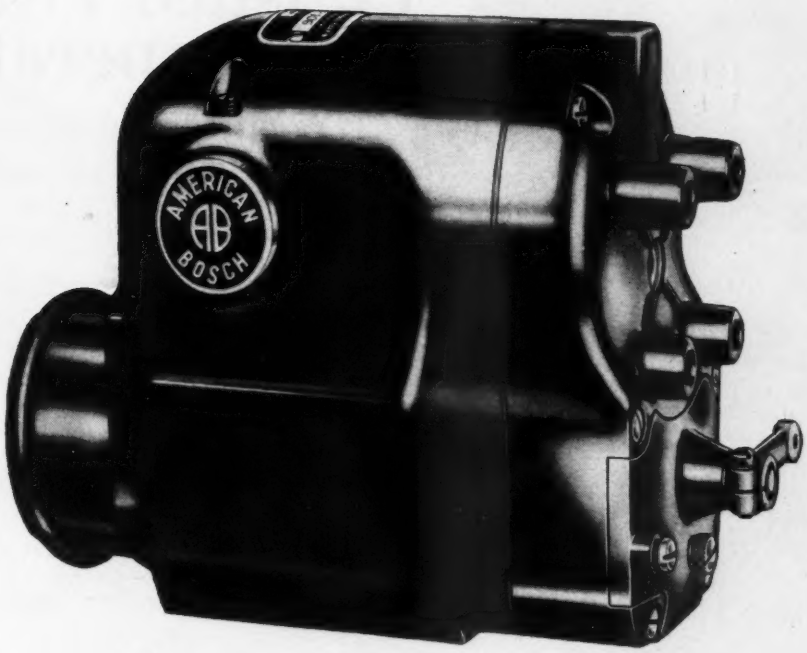
WIRE ROPE SLING DEPARTMENT
AMERICAN CHAIN & CABLE

TRADE MARK

In Business for Your Safety

ACCO Registered WIRE ROPE SLINGS

For PREMIUM PERFORMANCE



American Bosch *super-powered* magnetos pay big dividends in quicker, easier starting . . . long years of smooth, trouble-free operation.

For these famous products of American Bosch electrical research incorporate the latest technical developments. They are ruggedly built to the highest precision standards.

Offered as original equipment by many leading engine makers, American Bosch *super-powered* magnetos are also available for replacement in sizes to fit practically every type of farm and industrial engine.

For the name and address of your nearest American Bosch authorized Service Station or Distributor, write for free directory.

American Bosch Corp., Springfield 7, Mass.

AMERICAN BOSCH
Super-Powered Magnetos

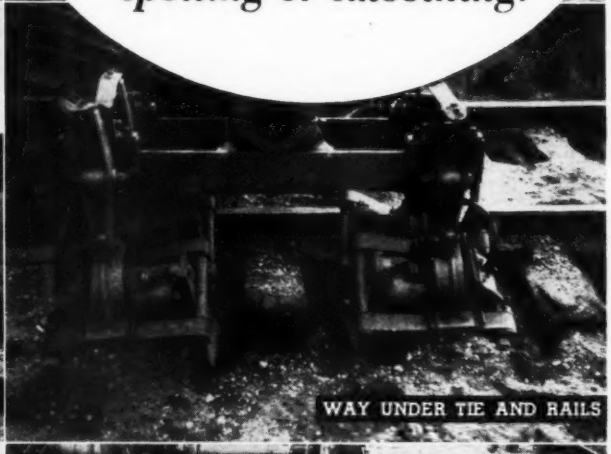
With the JACKSON MULTIPLE TAMPER

One Man *operates* 12 Tampers *and puts up* Finished Track in one operation

requiring no subsequent spotting or smoothing!

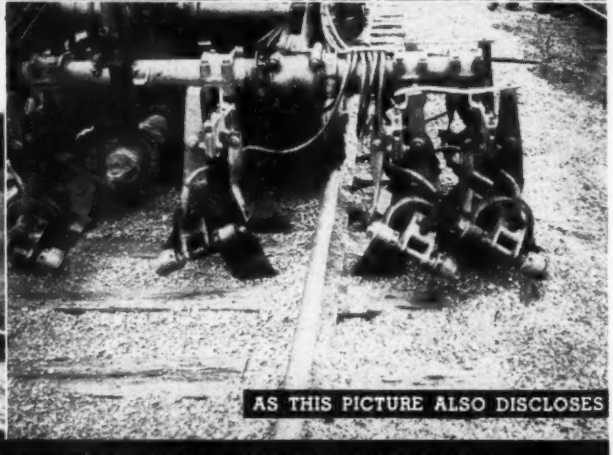
ADVANCING (the second man is just there for the ride)

POISED FOR ACTION



WAY UNDER TIE AND RAILS

DOWN THEY GO



AS THIS PICTURE ALSO DISCLOSES

In new or old work, moderate to high lifts, and in any type of ballast, the JACKSON MULTIPLE TAMPER will put up the best track that can be produced at unprecedented savings. For major ballast placing operations this equipment is truly beyond comparison. Thoroughly service-proven, each machine is guaranteed to perform as claimed. Get the complete facts, at once! Prompt action is necessary to secure '48 delivery.

ELECTRIC TAMPER & EQUIPMENT CO., LUDINGTON, MICH.

QUALITY

An unvarying ingredient in SUPER STEEL Alloy and High Carbon Steel Track Tools bearing the Hubbard imprint. Specify them for economical, dependable service.

All HUBBARD Track Tools are made to AREA Specifications

New York Office
3712 Woolworth Bldg.
233 Broadway
New York (7), N.Y.

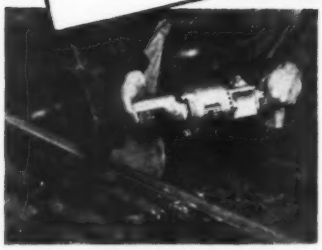
HUBBARD and COMPANY
Tool Division
Manufacturers of Alloy Spring Washers & Rail Anchors
6301 Butler Street
Pittsburgh (1), Pennsylvania

Chicago Office
Room 924
332 S. Michigan Ave.
Chicago (4), Ill.

Night and Day Railroads are Saving Money

5000-watt Generator, weighs only 175 pounds

with HOMELITE Carryable GENERATORS



For operating high-cycle grinders

For operating high-cycle wrenches

For operating Homelite electric chain saws

Just figure it out for yourself. With the power furnished by one of the new Homelite Gasoline-Engine-Driven Dual Purpose Generators, a crew can, operate the newest high cycle power tools as well as the standard universal tools and, in night emergencies, work under the advantages of brilliant floodlighting.

Yes, and what is more important, with Homelite *Carryable* Generators . . . easily transported everywhere . . . crews can always have the electric power they need any place they go.

This is the power age. And Homelite Generators are furnishing the power railroads need to operate modern, efficient tools that are reducing cost-consuming man-hours.

Write today for a free on-the-job Homelite demonstration. See how you too can save money and speed work with Homelite Carryable Generators.

HOMELITE CORPORATION

205 RIVERDALE AVENUE, PORT CHESTER, NEW YORK

Manufacturers of Homelite Carryable Generators • Pumps • Blowers • Chain Saws

ANTIDOTE FOR "POISONED" SUBGRADES

It costs thousands of dollars every year to doctor roadbeds that go to pieces under the impact and weight of heavy traffic. Generally this is a chronic ailment resulting from subgrades that are "poisoned" by harmful groundwater. The only sure cure is to drain the water out and keep it out. You can do this with ARMCO Perforated Pipe.

Durable ARMCO Pipe has holes scientifically placed to collect unwanted water and drain it off along the pipe invert. Subgrades become dry and stable—maintenance costs go down.

You'll like ARMCO Pipe for installing complete drainage systems or for patching up trouble wherever it occurs. The work moves fast and installation costs are low. Unskilled workmen, using simple band couplers, easily and quickly join long lengths of ARMCO Pipe into a strong, tight conduit. Shifting soils and severe frost action are no hazards. Your subdrainage system has proved strength to withstand crushing, cracking, or disjointing under the impact and weight of heavy loads.

Try ARMCO Pipe as health insurance for ailing roadbeds. It provides smoother rides . . . lower maintenance . . . safer operations. Write us for specific data. Armco Drainage & Metal Products, Inc., 2995 Curtis Street, Middletown, Ohio.

Export: The Armco International Corporation.

ARMCO

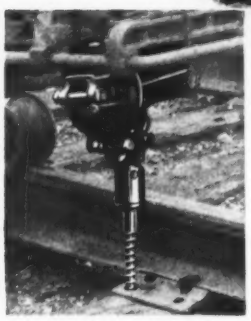
ARMCO PERFORATED PIPE

UNIFORM TIGHTNESS

more Speed-more Power

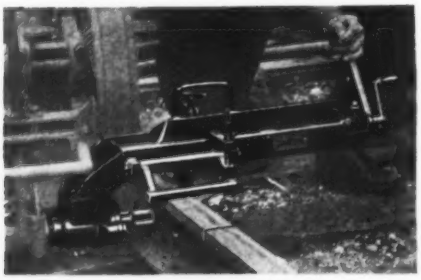
with a NORDBERG

POWER WRENCH



DRIVES SCREW SPIKES

Accessory for driving screw spikes automatically releases when screw is tight.



DRILLS RAIL

Wrench becomes a rail drill with this easily attached accessory.

FOR removing nuts from old rail and tightening bolts on new rail or for periodic joint maintenance, the Nordberg Power Wrench does the job faster and with greater uniformity of tightness than was ever possible by hand methods. Its ample power will move nuts that are "frozen" or rusted on. Adjustable spring loaded overload release maintains torque within plus or minus 5%.

The Nordberg Power Wrench can also be used for driving screw spikes and drilling rail by the addition of two simple, inexpensive Nordberg developed accessories. For more particulars on this rugged, dependable, versatile wrench, write for Bulletin 125.

NORDBERG MFG. CO.

MILWAUKEE 7, WISCONSIN

NORDBERG TRACK MAINTENANCE MACHINES

ADZING MACHINE • SPIKE PULLER • TRACK WRENCH • SPIKE HAMMER
RAIL DRILL • POWER JACK • CRIBEX • RAIL GRINDER • TRACK SHIFTER

INTERNATIONAL Crawlers

Walk the Rails to Improve Road Bed Structure

With Track-walking Shoes

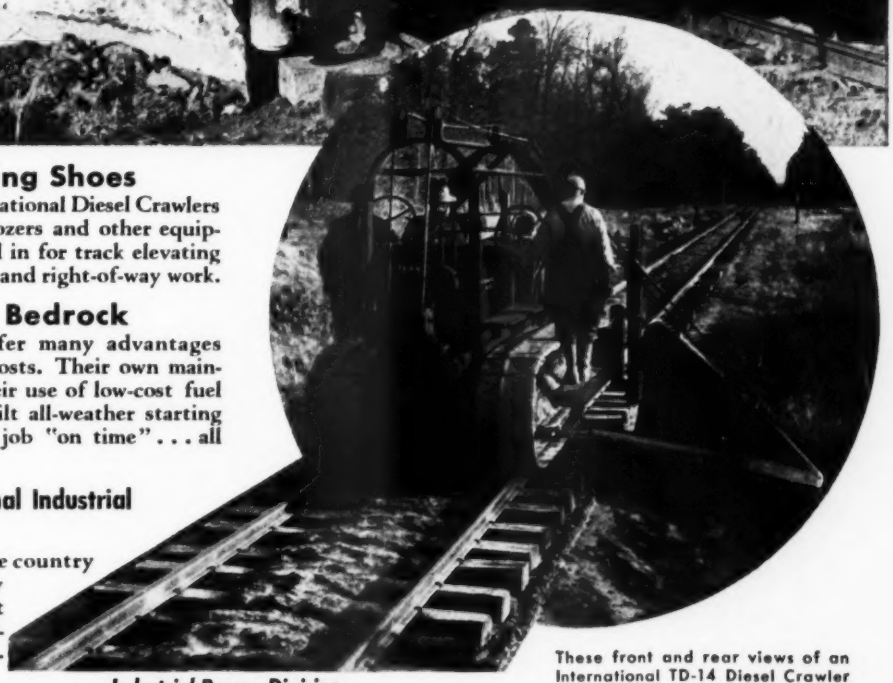
Now they're putting International Diesel Crawlers *on the rails*.. With wing-dozers and other equipment they dress grades, fill in for track elevating and do other maintenance and right-of-way work.

They Cut Costs to Bedrock

International Diesels offer many advantages which cut earth-working costs. Their own maintenance is inexpensive, their use of low-cost fuel is sparing, and their in-built all-weather starting system puts them on the job "on time" . . . all the time.

Consult Your International Industrial Power Distributor

In key cities throughout the country our distributors are ready to provide the facts about International Diesel Crawlers and matched equipment now available.



These front and rear views of an International TD-14 Diesel Crawler dressing the grade of a southern railroad explain its on-rail application.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL *POWER*

CRAWLER AND WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

Conserve
THE NATION'S FOREST PRODUCTS
by

VAPOR-DRYING*

Our latest contribution to the
WOOD PRESERVING INDUSTRY
for quicker seasoning and improved preservation.

CROSSTIES - POLES - PILES - TIMBERS

*Process Pat'd.

TAYLOR-COLQUITT CO., SPARTANBURG, S. C.

NOT A BRAND,

BUT A BRAND PROTECTOR

"CIRCLED R" ®

TIMKEN ®

It tells the world that "TIMKEN" is registered as a trade-mark in the United States Patent Office and cannot lawfully be used to designate products other than those manufactured by The Timken Roller Bearing Company — Timken Tapered Roller Bearings, Timken Alloy Steels, Timken Seamless Steel Tubing and Timken Rock Bits.

The trade-mark "TIMKEN" is the buyer's assurance of the finest products in their respective fields. Look for it. The Timken Roller Bearing Company, Canton 6, Ohio.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

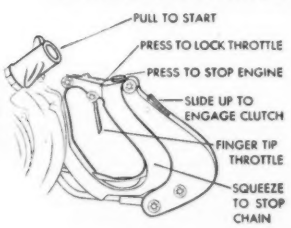
NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◎ AND THRUST ←◎→ LOADS OR ANY COMBINATION ✳

NEW! DISSTON
ONE-MAN CHAIN SAW
with Mercury Gasoline Engine

SERVICE PROVEN . . .
A time and money saver

Use it for light felling and bucking, for limbing, and construction timber cutting.

CENTRALIZED CONTROL



Here's a ONE-MAN Chain Saw with everything you could ask for. It has extra power and cutting speed. It's compact, well-balanced, light in weight. It's safe and easy to handle, simple to operate . . . Delivers full power with saw held at any angle . . . Will stand up long in hard, steady work . . . service proven. And it bears the Disston name . . . carries the Disston guarantee . . . your assurance of top quality in every detail.

RUGGEDLY BUILT FOR TROUBLE-FREE SERVICE

Use the Disston ONE-MAN Chain Saw on any kind of cutting within its 18" capacity. You'll say, as so many others are saying, "It's a real engineering achievement." Examine its special features. 2-cycle, 3½ h.p. (4000 r.p.m.), air-cooled engine with anti-friction bearings on all rotating parts . . . each precision built to within very close tolerances. Fuel meter gives automatic fuel feed and also acts as engine speed governor. Built-in automatic chain lubricator. Crankshaft type magneto, doubly protected against dirt and moisture.

Transmission gears run on anti-friction bearings. Clutch is positive, quick acting, manually controlled. Cutting chain of Disston Steel, fully interlocked. Replacable air cleaner. Magnapul starter. All these and many others combine to give you a ONE-MAN Chain Saw you can count on for dependable performance under all operating conditions.

ESTABLISHED 1840
REG. U.S. PAT. OFF.

Notching for felling. Note perfect balance because of design and position of handle.

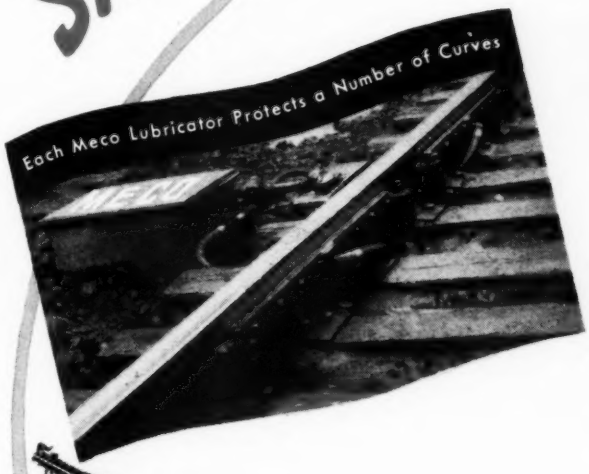
Write today for further particulars

HENRY DISSTON & SONS, INC., 541 Tacony, Philadelphia 35, Pa., U. S. A.

Photo courtesy Louisville & Nashville R. R. Co.

"STRIKE OUT" Curves' High Costs

with MECO lubrication



When MECO Lubrication goes in, high curve-rail costs go out! You decrease wheel flange friction, make curves safer for high speed trains. You reduce curve rail wear and make rails last two to four times longer.

MECO Lubrication is never "knocked out." It will be "in there pitching" when you relay rail, to make the *new* rail last two to four times longer, too!

Power Rail Layer Requires No Train Orders.

Mack Reversible Switch Point Protectors make switch rails last 8 to 10 times longer. Made by the Fleming Co., Scranton, Pa.

R-2791

★ Maintenance Equipment Company ★

RAILWAY EXCHANGE BUILDING • CHICAGO 4, ILLINOIS

COMPRESSION
Rail Anchors

Efficient, dependable protection against creepage in either direction. Two-way holding means uniform expansion at the rail ends—a better, more economical track structure throughout.

THE RAILS COMPANY

General Office
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DUFF-NORTON JACKS

- EASY TO HANDLE AND SPOT
- SAFE, STURDY, DEPENDABLE
- A JACK FOR EVERY NEED
- NO CREEPAGE
- PRECISION ADJUSTMENT CONTROL
- EASY TO OPERATE

TRACK JACKS

JACKS FOR BRIDGE CONSTRUCTION & MAINTENANCE

Choose the Jack you need

FROM THE WORLD'S MOST COMPLETE LINE

When you specify Duff-Norton jacks, you specify the finest jacks available for railroad construction and maintenance work. Unexcelled for sturdiness, safety, efficiency and long life—these jacks are manufactured in a wide variety of designs and capacities to meet the requirements of every lifting, lowering, pushing or pulling job. Write today for catalog and complete data on jacks best suited to your application.

THE DUFF-NORTON MANUFACTURING CO.

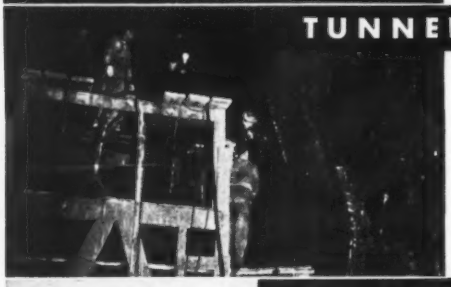
"The House that Jacks Built" • PITTSBURGH 30, PA.

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF LIFTING JACKS

HOW *Weatherproofing* ADDS YEARS TO THE LIFE OF BUILDINGS

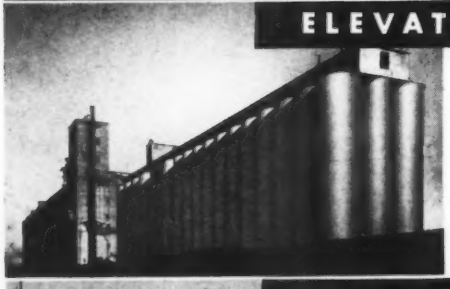
STATIONS

TUNNELS



ROUNDHOUSES

ELEVATORS



BRIDGES

The useful life of many railroad structures is shortened by neglect of natural deterioration and inattention to what might seem like unimportant physical damages. Crumbling mortar joints, water seepage, disintegrating masonry — all hasten the depreciation of a building, thus reducing its value as an income producing investment or a base for normal railroad operations.

You can stop such loss at its source, and add many years of use to stations, roundhouses, grain elevators, and other railroad properties through proper remedial restoration and protective maintenance. Years of experience in the solution of weatherproofing and waterproofing problems for many of the nation's leading railroads means that Western can add years to the life of your buildings. For only a fraction of a structure's value, decorative, and durable protection is guaranteed when you specify Western. Contact the nearest office without obligation, for a preliminary survey by an experienced Western engineer.

**Weatherproofing is the art of preserving buildings through an intelligent understanding of natural forces and the use of proper materials.*

• Concrete Restoration • Weatherproofing
• Sub-Surface Waterproofing
• Joint Treatment • Soil Stabilization

No materials for sale. All projects done under contract, force or set fee, insured and *guaranteed*. Railroad references available at all offices.

WESTERN
WATERPROOFING COMPANY
Engineers and Contractors
SYNDICATE TRUST BLDG. • ST. LOUIS 1, MO.
KANSAS CITY, MO. • SPRINGFIELD, ILL. • ATLANTA, GA. CHARLOTTE, N. C.

Write today for Pittsburgh's new booklet which lists its complete line of Railway Structural Maintenance Finishes. Included are many practical suggestions for their efficient, economical use.

Many of America's Leading Railroad Lines Depend Upon

PITTSBURGH RAILWAY FINISHES

CONTINUED preference for Pittsburgh Railway Finishes by many of America's foremost railroad systems must be considered an unusual tribute to their high quality. For these companies have found that Pittsburgh Finishes can be counted on not only to give maximum protection but also to add to the appearance of rolling stock and fixed properties. Call on us for advisory service. Our wide experience in this field often can save you time and money.

PITTSBURGH RAILWAY FINISHES FOR EVERY NEED:

CARHIDE—for wood and metal freight cars of all types.
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SNOLITE—for signs, fences, cattleguards and crossing gates.

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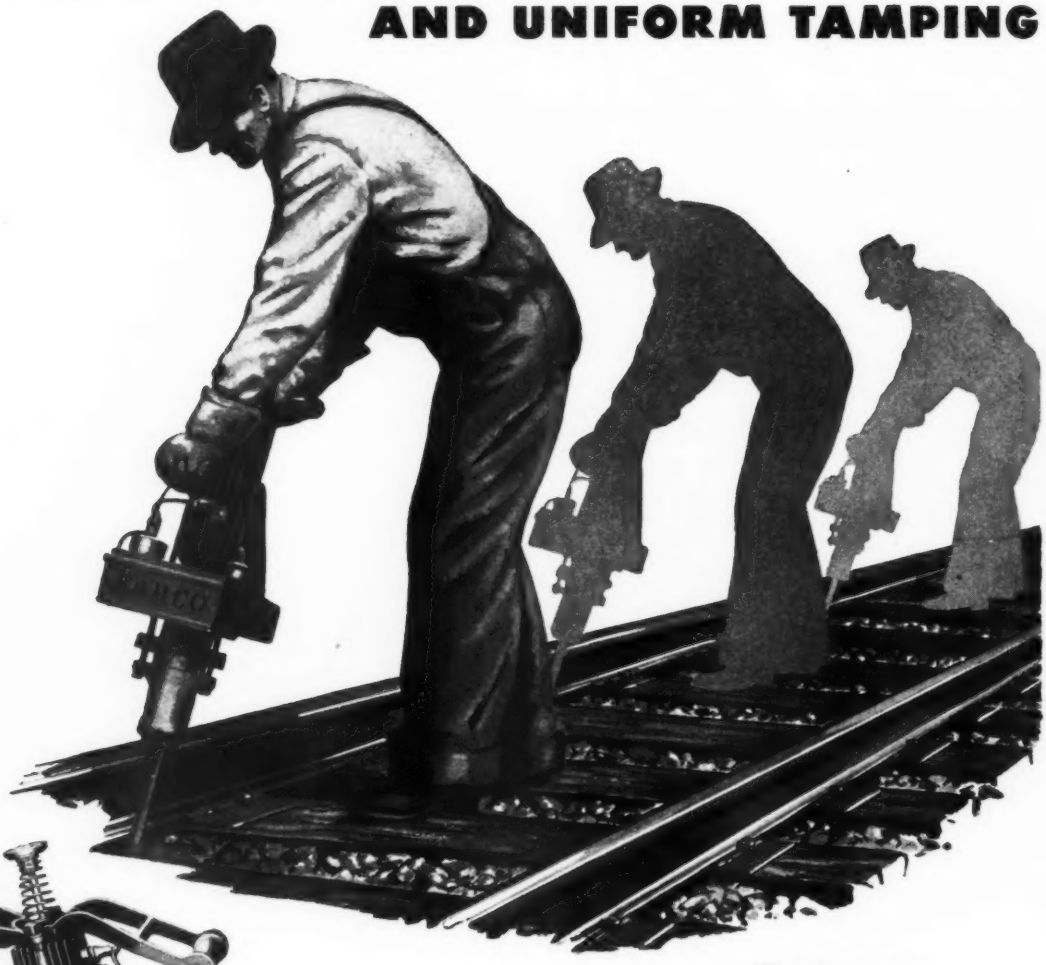
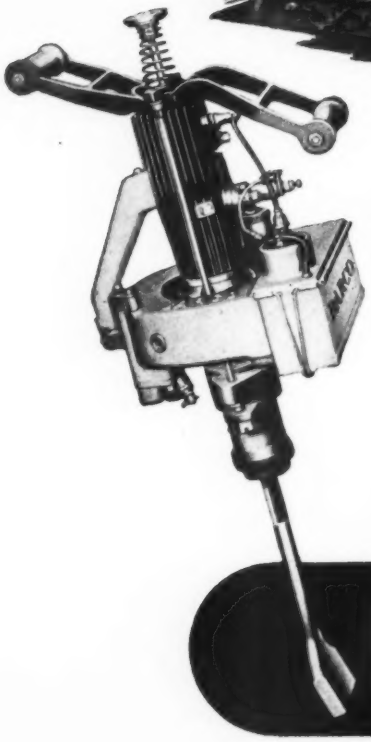
PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS

PITTSBURGH PLATE GLASS COMPANY

FOR MORE PERMANENT AND UNIFORM TAMPING



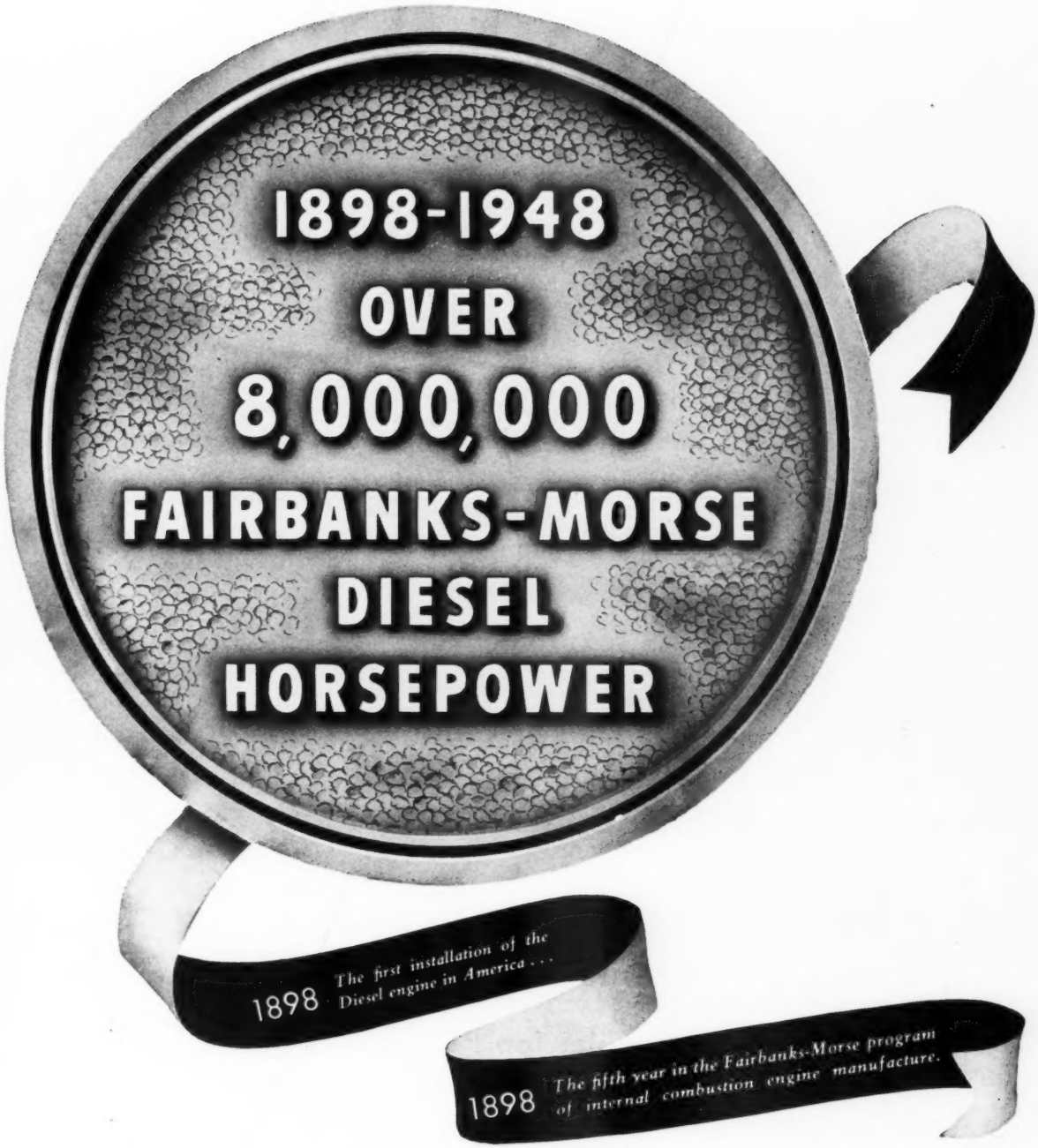


MECHANIZE WITH A BARCO

Ballast under a Barco-tamped tie is firmly and uniformly packed for the full width of the tie and is less subject to unequal compression from passing trains. The best hand-tamping can't compare with the work done by the fast, powerful blows of these speeder-uppers. Self-contained and portable, these economical sluggers save extra time at congested points because they can be moved off the right-of-way quickly. For over 10 years Barco has been working the year around, not only on tamping, but crib-busting, ice-breaking, and many other jobs—with a minimum of time and cost. Write today to Barco Manufacturing Company, 1805 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

BARCO UNIT TYTAMPERS

FREE ENTERPRISE — THE CORNERSTONE OF AMERICAN PROSPERITY


1898-1948
OVER
8,000,000
FAIRBANKS-MORSE
DIESEL
HORSEPOWER
1898 The first installation of the Diesel engine in America . . .
1898 The fifth year in the Fairbanks-Morse program of internal combustion engine manufacture.

1948—The fiftieth anniversary of the Diesel engine in American service . . .

The history of the industry documents many achievements

When it comes to Diesels . . . by Fairbanks, Morse & Co. in the design and production of Diesel engines . . .

There will be more, in the years ahead . . .

Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • STOKERS
SCALES • MOTORS • GENERATORS • PUMPS • FARM EQUIPMENT
MAGNETOS • RAILROAD MOTOR CARS and STANDPIPES

Not a leak in this 18-acre roof in 22 Years!

Another long-term service record for durable Johns-Manville Asbestos White Top Roofing

THIS ROOF has an area of 800,000 square feet. A recent inspection revealed that the Johns-Manville materials used are in excellent condition and good for many more years of service.

And the Chicago and North Western Railway, which installed the 8,000 squares of J-M White Top Roofing on its Proviso, Illinois, L.C.L. Freight House, tells us that maintenance requirements have been very low.

That's because durable White Top is made of plies of asphalt-impregnated asbestos felts cemented together with asphalt. This construction makes it rotproof and fire-resistant . . . gives it the stamina a roof needs to stand up under long exposure to sun, wind and rain. A white (unimpregnated) asbestos felt on top gives it a clean, light- and heat-reflecting surface.

This J-M asbestos ready-to-lay roofing was designed especially to provide long-term, low-cost service on pitched roofs. Other Johns-Manville quality roofings — both ready-to-lay and built-up — are available for a wide range of requirements on railroad buildings. For full information, write Johns-Manville, Box 290, New York 16, N. Y.

JM PRODUCTS

Johns-Manville **90 YEARS OF SERVICE TO TRANSPORTATION**

Le Roi Announces the 31 Clay Digger

— with new design features that reduce both digging and upkeep costs

Here's a digger that has everything you want. Just take a look at all these design advantages:

● **Short 19-inch length** — is responsible for the fine easy-handling balance of the new 31 clay digger.

● **It weighs only 18 pounds** — A man does more work with the new Le Roi 31, and uses less effort.

● **Exclusive new buffer design saves time and money** — This new buffer consists of molded rubber bonded to hardened split steel rings. There is only one piece to handle. Changing tools requires just a few seconds and no effort at all. Your operator does more digging.

● **Air consumption is low, efficiency high** — The 31's new trouble-free valve design uses air sparingly. The high efficiency — that is, the 31's ability to produce a lot of work — is made possible by a unique arrangement of valve-chest differentials.

● **Only the 31 has an integrally-built lubrication system** — Oil from a large reservoir in the handle is metered into the live air stream and carried to every working part.

● **The 31 is sealed from dirt and grit** — the new rubber buffer keeps destructive foreign matter out of the digger.

● **Cylinder life is greatly increased by the use of renewable spacer and chuck bushings** — Moreover, the handle, cylinder, and retainer are made from sturdy drop forgings. That is why Le Roi 31's serve you efficiently for years.

Give your men a clay digger that they like to use — give them a digger that makes them more productive — give them Le Roi 31's.

Your nearby Le Roi distributor can show you how the 31 Clay Digger design pays off in lower costs. Write us for specifications and latest literature.

LE ROI COMPANY

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Le Roi 31 Clay Diggers give you a good opportunity to reduce your digging costs

MORE AND MORE ROADS ARE

SPEEDING RIGHT-OF-WAY WORK

with

MICHIGAN

OFF-THE-TRACK
SHOVEL-CRANES

Along more and more roads, Michigan Mobile Shovel-Cranes are shortening maintenance, construction and materials-handling jobs. Michigan's truck mobility, power and traction get it to the job in a hurry, give it greater freedom of movement on the job. This, plus its high operating speed and versatility, simplifies the problem of carrying on work at top efficiency with fewest possible delays to traffic.

Send for your copy of "MICHIGAN SHOVEL-CRANES ON THE JOB."

MICHIGAN

MICHIGAN POWER SHOVEL COMPANY
400 SECOND STREET, BENTON HARBOR, MICH., U. S. A.

Flame-Cleaning

BEATS THE WEATHER

Do you know why your bridge paint gangs don't start work earlier in the spring and operate later in the fall? Have you ever stopped to count the lost hours because it was impossible, even in mid-summer, to paint damp surfaces? The answer to these problems is oxy-acetylene flame-cleaning.

Flame-cleaning makes it possible for your paint gangs to work on steel surfaces efficiently and economically even during the cold, damp days of early spring and late fall. And with flame-cleaning, your gangs put in a "full day" because they are not delayed by waiting for the sun to warm up and dry off surfaces.

BRIDGE AND MAINTENANCE ENGINEERS should write for Booklet F. which tells how the flame-cleaning of bridges will save money for your railroad.

THE OXWELD RAILROAD SERVICE COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
Carbide and Carbon Building Chicago and New York
In Canada:
Canadian Railroad Service Company, Limited, Toronto

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

. . . better paint with

LIQUID ALUMINUM

Passengers resent boarding cars heated to oven temperature by the sun . . . and attempts in the station to cool such overheated cars are time consuming and costly. You can reduce both annoyance and expense by painting your cars . . . all over, or just the roofs . . . with *Liquid Aluminum.*

Liquid Aluminum is aluminum paint made with Reynolds Aluminum Pigments —the very foundation of quality for a quarter-century. *Liquid Aluminum's* remarkably high reflectivity—up to 75% of the sun's rays—reduces summer temperatures inside cars as much as 15° . . . keeps passengers more comfortable.

Use *Liquid Aluminum* on freight cars, too—particularly for transportation of perishables. This low cost, long lasting protection stands up under the abrasive action of cinders, and attacks of weather . . . withstands sudden temperature changes. And don't overlook the beauty that *Liquid Aluminum* can add to your rolling stock —an important factor in public good will.

Reynolds works so closely with leading paint manufacturers that when you buy a good brand of aluminum paint, the chances are it will be *Liquid Aluminum.* But it will pay you to check back and make sure. Reynolds Metals Company, Pigment Division, 19 East 47th Street, New York 17, N.Y.

FOR COATINGS OF . . .

REYNOLDS ALUMINUM PIGMENTS

REYNOLDS METALS

LIQUID ALUMINUM

Reynolds Pioneering Made Aluminum Competitive—take advantage of it!

For additional information, use postcard, pages 539-540

THE American DIESELECTRIC

A Revolutionary New Locomotive Crane

Once upon a time, the coal scoop was a mighty important tool on locomotive cranes. But new and better power sent the scoop to the scrap heap.

Today, with the AMERICAN DIESELECTRIC on the scene, many other outworn features are disappearing forever. For example, the cluttered, awkward machinery deck—where even the simple job of greasing can be unbelievably expensive—has now been magically transformed.

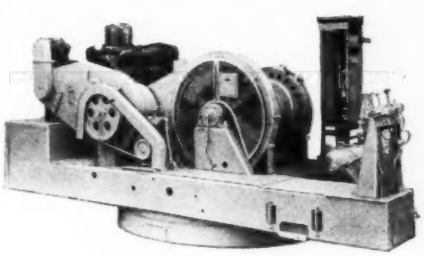
Summed up, the many advanced new features of the DIESELECTRIC mean just this: Tremendously increased production . . . astonishing cash savings on maintenance work . . . faster operating speeds . . . less operator fatigue . . . *more tons moved at lower cost.*

- **DIESEL** *power to the deck;* **ELECTRIC** *power to the trucks*
- **SEVEN TONS** *of wearing parts eliminated*
- **CUTS UPKEEP** *25% to 50%*
- **PAYS FOR ITSELF** *in five years!*

American Hoist
and DERRICK COMPANY
St. Paul 1, Minnesota

Plant No. 2: So. KEARNY, N.J. • *Sales Offices:* NEW YORK CHICAGO • PITTSBURGH • NEW ORLEANS • SAN FRANCISCO

NEW Deck Design
MAKES SERVICE WORK EASY!



● **It's what you don't see in this picture of the DIESELECTRIC machinery deck that's important. First, all travel machinery is gone—because the electric traction system is all in the underbody. There's no pyramiding of machinery. Tail swing has been shortened by two feet. Walkways are clear, open, safe. All units needing repair or lubrication are instantly accessible. Result: lowest maintenance costs in locomotive crane history!**

AMERICAN HOIST and DERRICK COMPANY 8605
St. Paul 1, Minnesota

Please send your Catalog No. 600-L-4, describing the AMERICAN DIESELECTRIC Locomotive Crane.

Name_____

Company_____

Address_____

City_____ State_____

No. 233 of a Series

Railway
Engineering and Maintenance
SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO 3, ILL.

Subject: Adequate Reporting—Our Job

May 1, 1948

Dear Readers:

Since the convention of the American Railway Engineering Association and the exhibit of the National Railway Appliances Association in Chicago during the week of March 15, we, the editors of Railway Engineering and Maintenance, who, as you may know, also make up the engineering unit of the editorial staff of Railway Age, have received many letters of commendation on the coverage of these important events in our two publications. Naturally, these compliments, all of which were unsolicited, have been highly gratifying, and especially so because they have come, almost entirely, from men particularly active in the two associations, and thus in the best position to judge the adequacy of the job done. But our greatest satisfaction comes through the fact that all of these letters emphasize the character and quality of the coverage, which, of course, is the essence of any good editorial or reporting job.

But a thorough job of covering any important function adequately, especially one of the character and scope of the A.R.E.A. meeting and N.R.A.A. exhibit, also requires space—pages—in repeated issues—and it has only recently come to my attention just how much space was devoted to these events in Railway Age and Railway Engineering and Maintenance. This came about as we were binding under separate cover, for ready future reference by ourselves and a few others, all of the material presented in our publications relating to the March events.

In this connection, it was reported to me that we published 14 feature and news stories on these events, which occupied a total of 45 1/2 pages, or approximately 1258 column inches, in our issues from January 24 to April 1. And this did not include the 64 pages, with their 896 column inches of news, programs and registration lists, contained in the three "Junior" editions of Railway Age distributed daily at the convention and exhibit. Mention might also be made of the 100 personality, convention and exhibit pictures shown in all of these publications.

These facts were interesting to me, as they may be to at least some of you, who sometimes wonder, I am sure, how our relatively small staff of five men "turns it out". We really did turn it out, but it was made the easier because of the splendid cooperation from many of you, and because our heart was in the effort—in the interest of both associations and of keeping you abreast of what was going on.

But, referring again to your letters, I am still gratified most that your compliments have been with respect to the character and accuracy of our coverage. With us, that is the real measuring stick of a good publication job.

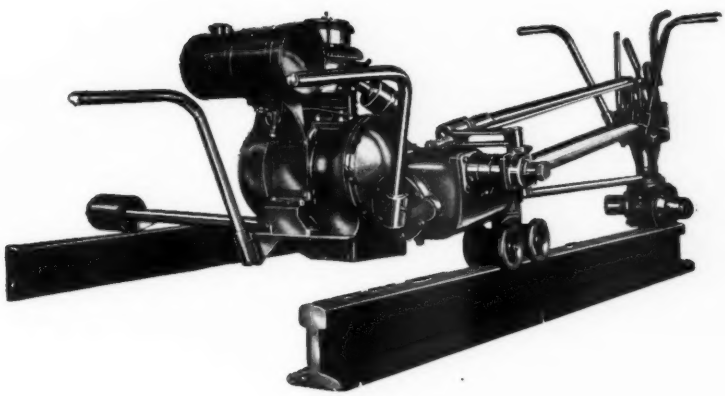
Sincerely,

Neal D. Howard

NDH:jb

Editor

Periodical tightening of track bolts with Raco Power Track Wrench



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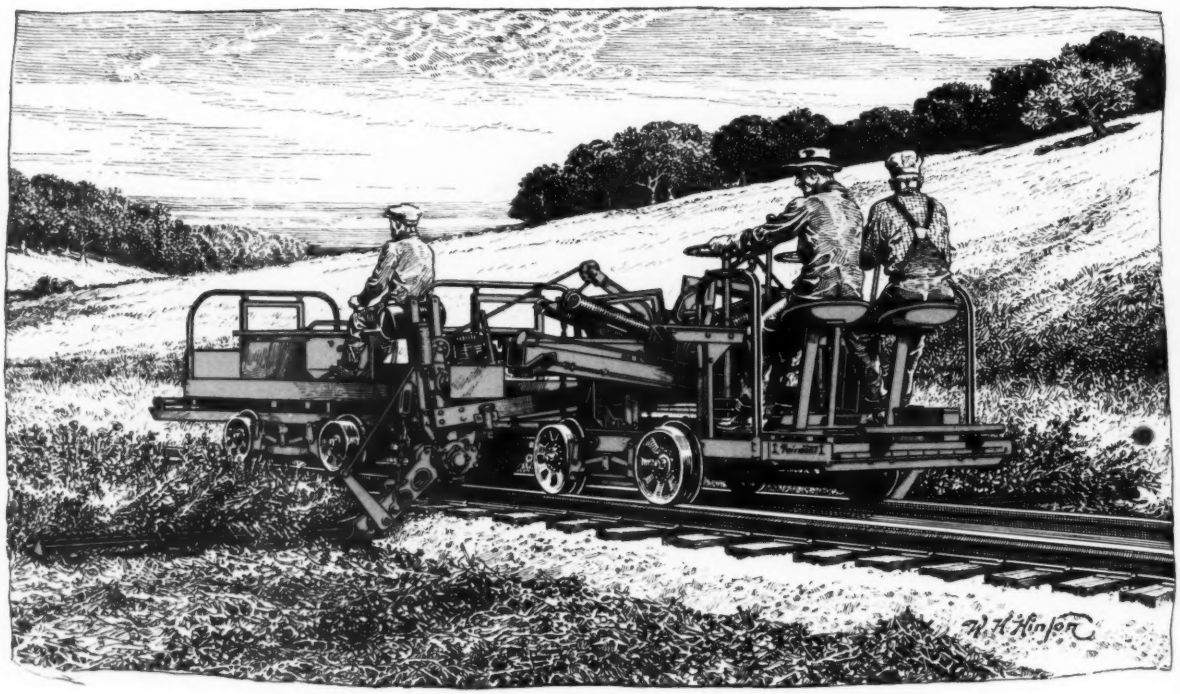

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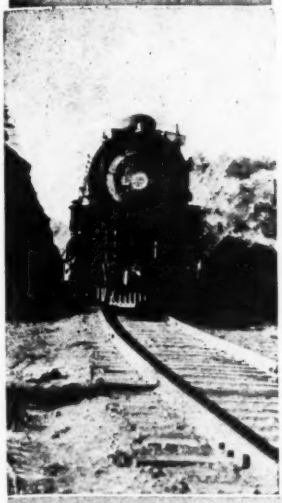

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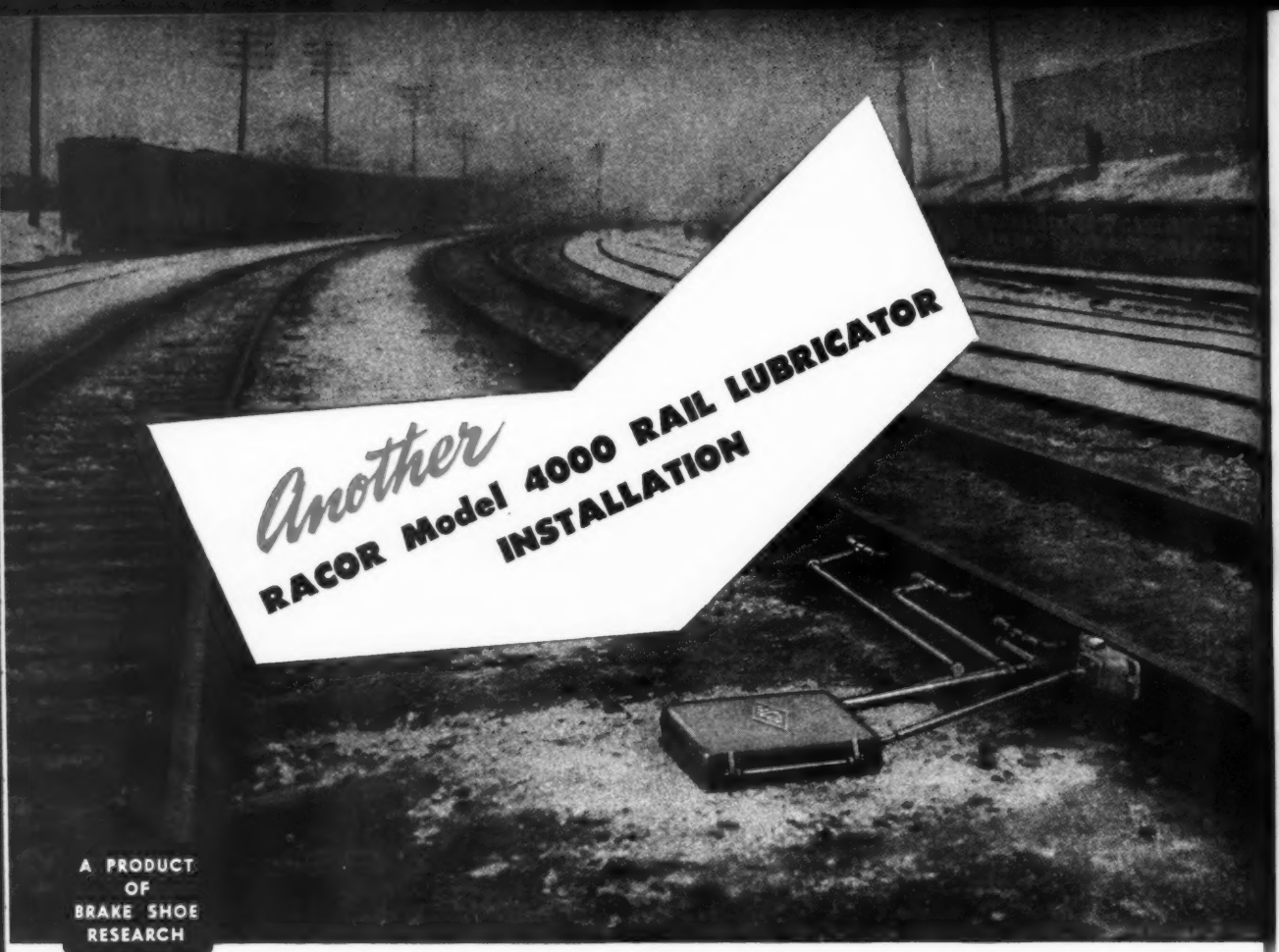

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Railway Engineering and Maintenance

Another War—

Preposterous, But Let's Face Realities

Inconceivable as it may seem, recent months have witnessed events in international affairs that have caused deep concern in the United States, and that have struck fear in the hearts of millions throughout the rest of the world. Already, less than three years following the close of World War II, with its widespread devastation and suffering—and still open wounds in many countries—the specter of still another war, conceivably more devastating and cruel than the last, raises its head.

There is nothing to gain, and everything to lose, by hiding the facts—playing the ostrich—in this matter. The facts are, unmistakably, that the makings of war are again on the march. There is one country in the world today whose program for world revolution, with ultimate complete political and economic domination, is as much an open book as "Mein Kampf." And there are plenty of examples the world over to indicate that this program has a definite schedule. All this can lead to but one thing—war—unless this spirit of aggression is somehow quenched by international agreement, which is the cherished hope of every true American, or, if necessary, by overwhelming counter-power.

If war is to come, it is given only to the aggressor to know when. Likewise, he alone knows where it will strike first. But one thing is a certainty—that the first blow will be another "Pearl Harbor," and many times more devastating—and that this continent will not be immune from attack.

If these things come to pass, and the United States is involved, as it surely will be, our only hope of victory—indeed survival—will lie in our preparedness, militarily and industrially, with a transportation machine ready immediately to meet all demands. That we are not now prepared in any of these categories is no secret. But, fortunately, the first steps are being taken. The weakened military arm is being strengthened; even industry is being recataloged for prompt conversion to war production, if necessary. But how about transportation—and especially the railroads?

During the last war, the railroads, unharmed by enemy bombing or sabotage, were the backbone of all military and industrial transportation of the country. Without them, victory would have been long delayed and even doubtful. If another war comes they will be equally or even more essential. Then, one can be sure, time will not permit leisurely preparedness. Furthermore, next time, they cannot expect to be free from enemy interference, and in all probability will be subject to open attack. Then, as was so conclusively proved in Germany during the last war, only a superabundance of line and rolling facilities can prevent their failure to meet the needs of the country, if not their collapse.

That the railways are not better prepared today to handle domestic postwar traffic, and thus to meet any emergency, is due to many causes. Shortages in materials, higher costs, and industrial strife both without and within their ranks, have been important factors. Despite these handicaps, the railways, buoyed up by continuing heavy traffic demands in 1947, spent, dollarwise, in that year more for capital improvements to their equipment and rolling stock than in any year since 1923; more for capital improvements to their fixed properties than in any year since 1930; more for the maintenance of their equipment, except in 1944 and 1945, than in any year since 1920; and more for the maintenance of their fixed properties, except in 1944 and 1945, than in any year in history.

And, according to plans, 1948 was to have been a still larger year—and eventually may prove to be. However, strikes, such as the recent coal

shutdown, with its enforced slowdown in steel production, the closing down or curtailment of work in railway shops and the shops of equipment builders, and the serious delay occasioned to an early start on roadway and maintenance operations on many roads, have certainly been no stimulus to that end.

Furthermore, the repeated demands for higher wages and easier working conditions by practically all railway employees, without compensating increases in production; the sharp sloughing off of railway earnings in recent months; government suits designed to extract from the roads a large percentage of their wartime earnings; and the constant sniping by those who would see the railways under government control and operation—all are combining to defeat the welfare of the country in the event of an emergency, and, if continued, unaccompanied by compensating factors, can place us all in jeopardy.

Few loyal Americans working on the railways, knowingly, would be a party to any such weakening influences, either to their industry or to their country—but many today are, and must be made to see the facts. Strong railroads are an asset to the entire nation and to every employee. More than that, they may prove indispensable. And haste to make and keep them strong is of the essence.

Rising Wages—

Create Need for Re-Examining Many Practices

AT all times railway maintenance men have the responsibility of so conducting their work that costs are kept to a minimum. During periods such as the present, when the cost of practically everything, including labor, is going up, this responsibility assumes added significance. This is not only true because of the resulting increased pressure for economy but also because of the fact that rising costs sometimes have the effect of producing fundamental changes in relationships—and maintenance men must be alert to detect any such changes that may apply to their work.

It is a well-known fact, for instance, that rising wages are an increased incentive to use machines—because it may be expected that the savings thereby realized will be greater than would have been the case when wages were at a lower level. In other words, an established relationship has been disturbed. This line of reasoning can be carried a step further to develop the thought that rising wages may have the effect of making it profitable to adopt practices that previously were considered uneconomical or at least not warranted by the limited savings in prospect.

Many maintenance officers, for example, will be able to recall instances in which particular machines, devices or practices were tried and discarded because it was found just as economical, or more so, to do the work by hand or by some other machine or method. Now that wages have increased 100 per cent or more since before the war, is it possible that reconsideration of some of these discarded machines or practices would now reveal that their regular use would produce worthwhile savings?

The same thought applies to materials. With installation costs higher than ever before, it would seem to be generally true that increased economy is attached to materials having a greater service life. In other words, there are conceivably instances in which economic relationships may have changed to the point where greater economy is now possible by putting more emphasis on durability.

Actually, what the present situation demands is careful scrutiny of practically every operation or practice, being careful to keep in mind the fact that relationships long taken for granted may no longer be valid.

Water Problem—

Aggressive Attitude May Prove Most Profitable

WHENEVER two or more railway water service men get together these days the conversation is very likely to get around to a discussion of the problems facing them as a result of the rapid Dieselization of motive power, and the prospect that many districts will soon be completely Dieselized. The essence of the problem is contained in the fact that, during the transition period from steam to Diesel power, facilities must be provided to furnish suitable water for both types. Further, there is in some quarters a considerable feeling of uncertainty regarding the final outcome of the struggle between these (and other) types of power.

Under these circumstances there may be a disposition to handle the situation merely by providing what additional water-treating and delivery facilities are needed to serve the requirements of the Diesels, and then, as regards existing facilities to adopt a waiting attitude with regard to future developments. However, this attitude does not necessarily give due consideration to the obligation of the water-service forces—which will remain in effect as long as steam power is operated—to provide suitable water for such power at minimum cost. If this responsibility is kept constantly in mind it is not unlikely that various courses of positive action—infinitely more profitable than a passive attitude—will suggest themselves.

An example of a possible line of action is concerned with the older water-treating and pumping plants that may have been rendered obsolete by the development of equipment and methods capable of producing better water at a lower cost. Even though Diesels have come into service in territories where these antiquated plants are located, the prospects in most instances are that it will be necessary to supply water for steam-locomotive use for a good many years to come. Isn't it possible, therefore, that the modernization of some of the older stations, with resultant benefits through lower costs and a better quality of water, could be justified at this time? A further consideration is that, with slight additional treatment in many cases, the water produced by the modernized plants could be rendered suitable for use by Diesel locomotives.

The action that will be taken by specific railroads regarding the water-supply problems created by Dieselization will depend a good deal on the point of view adopted. If the viewpoint taken gives due consideration to the continuing demand for economy, while not overlooking the long-range factors, the result is likely to be constructive action rather than passive waiting.

The Pennsylvania's program for 1947 called for more than 823 miles of track to be tamped with air tampers

Tamps Track With *Large* Crawler Compressors

With several hundred miles of track scheduled for air tamping each year, the Pennsylvania has adopted 315-cu. ft. crawler-mounted compressors, each capable of operating 24 tamping guns, as a means of increasing the production of its air-tamping gangs. This article discusses the scope of the tie-tamping programs on the Pennsylvania's main lines, shows the extent to which the crawler units are being used in this work, and describes the organization of a typical gang equipped with one of the crawler units.

FOR a number of years the Pennsylvania has been building up a fleet of self-propelled, crawler-mounted air compressors, rated at 315 cu. ft. capacity, for use with air-tamping gangs working on the main lines of the road. As a result, 60 such units, each capable of operating 24 tamping guns, are now in service on this road. The use of these compressors is considered to have important advantages, attributed partly to the capacity of the compressors, but primarily to the elimination of many of the costly delays that were experienced when using track-mounted compressors set off at the side of the roadbed.

The principal delays experienced when using the track-mounted units occurred when it was necessary to move the compressors forward, along with the long pipe lines used to convey the compressed air to the tamping guns. In contrast, the crawler units move along the roadbed shoulder, keeping pace with the tamping work as it progresses, and the delays are largely confined to those occasioned by traffic.

First Used Tampers in 1918

Air tamping was first introduced on the Pennsylvania in 1918, when the road acquired a number of 4-tool compressor outfits. These units were replaced in 1925 and 1926 by larger track-mounted compressors which were capable of operating 12 tie-tamping guns. The practice with these larger units was to set them off on the shoulder and deliver the air to the tampers through temporary pipe lines. For this purpose 1,600-ft. of 2-in. wrought-iron pipe was used with each compressor. Later, with improvements in the tamping guns, four additional tools were added to each outfit to bring the total to 16 tools, and the wrought iron pipe was replaced with 5,000 ft. of 4-in. lightweight steel pipe with quick-coupling connections.

These track-mounted models, of which a large number were purchased by the road, were used exclusively for air-tamping work on the Pennsylvania until in the late thirties, when a self-propelled crawler unit was purchased for use on the New York division, between Philadelphia, Pa., and New York. The efficient performance of this unit in a territory said to have the greatest traffic density of any stretch of track in the world, led to the

Above—The practice is to perform eight-point tamping on each tie. Right—One of the 24-tool crawler compressors, moving along the shoulder of the roadbed

purchase of several similar compressors immediately before the war. As already pointed out, a considerable number of additional crawler units have now been acquired—enough, in fact, for use on all main-line divisions on which air tamping is done. These units were furnished by the Chicago Pneumatic Tool Company, New York, Ingersoll-Rand Company, New York, and by Schramm, Incorporated, West Chester, Pa.

The main lines of the Pennsylvania form a pattern somewhat like the letter Y. The stem of the Y may be said to be the line extending from Philadelphia to Pittsburgh, 353 mi., while the arms of the Y diverge at the latter point, leading to Chicago, 468 mi., and to St. Louis, Mo., 611 mi. Another important route forms the base of the letter, extending from New York, through Philadelphia and Baltimore, Md., to Washington, D. C., 227 mi. Still another important link, over which traffic moves between Washington and the West, is the 83-mi., double track line between Baltimore and Harrisburg, Pa.

The New York-Washington territory and that from Philadelphia to Pittsburgh are almost entirely four-track lines. The line to Chicago is primarily double track with short stretches of three and four tracks, while that to St. Louis is double track between Pittsburgh and Indianapolis, Ind., 370 mi., with alternating stretches of single and double track beyond that point. Except for the Columbus-St. Louis section, 420 mi., all of these main lines are ballasted with crushed stone.

The Pennsylvania uses air tampers in a variety of ways in carrying out its annual maintenance program. Where track is to be completely worked, such as in "taking care" of new rail, or in general rehabilitation work, involving tie renewals and respacing, the practice is generally to make a lift with ballast forks. After allowing an interval for settlement under traffic a light surface raise, averaging about one inch, is made out-of-face with air tampers.

The 1947 Program

The Pennsylvania's maintenance program for 1947 called for more than 823 mi. of track to be tamped with air tampers. Of this total, 103 mi. were programmed for the four-track New York division, between Philadelphia and New York, while 326 mi. were planned for the Eastern region, which comprises the remainder of the territory east of Altoona, Pa., including the Philadelphia-Washington territory. Another 272 mi. of such work were proposed for the Central region, which includes the territories between Altoona and Pittsburgh, Pittsburgh and Columbus, on the St. Louis line, and Pittsburgh and Crestline, Ohio, on the line to Chicago. In the Western region 122 mi. were programmed for the rock-ballasted main line between Crestline and Chicago.

The total of 823 mi. did not include all of the mileage on which air tamping was done, such as the short distances tamped by section gangs or "spot" tampers. This work is carried out annually on many of the road's secondary lines. These include the line between Harrisburg, Pa., and Buffalo, N.Y.; from Cleveland, Ohio, and New Castle, Pa., to Pittsburgh, and a number of other routes.

Gang Organizations

Air-tamping equipment is assigned to the several divisions on the various regions by the respective chief engineers maintenance of way of the regions in accordance with the divisions' tamping programs and the relative importance of the individual stretches that are to be tamped when considered from a regional standpoint. Thus, for example, in 1947, on the Central region, the Pittsburgh division received six of the large crawler units, the

Panhandle division received five, and the Eastern division was assigned nine. In addition, each division was assigned one or more of the older compressors for use where the crawlers could not be used effectively.

A number of tamping gangs using 24 tamping guns were organized to perform eight-point tamping on each tie. However, labor shortages in some localities made it necessary to use only 16 guns. The force when using 24 guns includes a foreman, an assistant foreman, a machine operator and 35 laborers. The laborers are organized as follows: 1 water boy; 2 flagmen; 2 safety men, located close to the gang and equipped with whistles, white warning discs and the master air-supply valve; 2 men handling and setting the jacks; 24 men operating the tamping guns; 2 men throwing in loose ballast as the tamping progresses; and 2 men backfilling the track with ballast. With this organization these gangs, in 1947, tamped an average of approximately 850 ft. of track during an eight-hour day, including delays and travel time. At times the daily production reached 1,000 ft.

These views of large crawler compressors in operation were taken prior to the more general adoption of the hose assemblies described in the article

Use Two Hose Assemblies

As a means of reducing delays to the minimum when raising the inside tracks in multiple-track territory, the Pennsylvania has equipped each crawler compressor with two complete hose assemblies to carry compressed air from the compressors to the tamping guns. Each of the hose assemblies consists of a 220-ft. length of 2-in. hose leading from the compressor to a "Y" connection, and two additional 200-ft. lengths which lead from the "Y" connection to two 12-outlet tamping manifolds.

In practice the single line is laid along the roadbed shoulder for a distance of about 200 ft. in advance of the compressor, and is then passed under the rails of the outside track so that the "Y" connection lies in the inter-track space. The 200-ft. lines leading to the manifolds are then laid along each side of the track to be tamped, extending from the "Y" back to a point about opposite the compressor.

Tamping is then begun and the manifolds are dragged along in the inter-track spaces as the work progresses. Thus, between the point of origin and the limit of the separate tamping lines, 400 ft. of track can be tamped, and during this period of work the crawler compressor is moved ahead the same distance.

Meanwhile, the second hose assembly is laid out along the tracks in advance of the section being tamped, starting at the point where it is expected the tamping work with the first assembly will end. In this case, however, the single lines leading from the manifolds to the "Y" connection are laid out first and the main supply line is then laid from the "Y" underneath the outside track and back along the roadbed shoulder to meet the compressor at its limit of travel under the first set-up.

Two outlets, each with separate control valves, are provided at the air receiver of the compressor. When the compressor, delivering air to the tampers through one of these outlets, nears the limit of its travel along the roadbed shoulder, the main supply line of the second hose assembly is connected to the second outlet. Then, when the tamping guns reach their limit of movement, it is but a simple matter to disconnect the manifolds, connect them to the second set of lines, turn the supply of air from the compressor into the new assembly, and proceed with the work.

When it becomes necessary to move the compressors over bridges or around obstructions along the track, it is the practice to obtain the use of the outside track and move the unit, under flag protection, along the ties, with its tracks straddling the outside rail.

Above—Showing how water is splashed over the roadbed at a track pan as a locomotive takes on water. Right—The track pans at Painesville, Ohio, after completion of the drainage project

Track Pans Need Good Drainage

The use of track pans, or water pans, by means of which steam locomotives can take on water at speeds up to 80 m.p.h., thus eliminating time-consuming stops for water, was adopted by the New York Central System many years ago. However, when locomotives take water "on the fly," a substantial quantity of it is splashed over the roadbed and the rapid disposal of this overflow water poses a problem in drainage. In this article, the author tells how drainage systems embodying longitudinal, inter-track subsurface drains, made of vitrified-clay, cradle-invert pipe, placed in combination with inter-track gutters paved with precast concrete blocks, were installed at a number of these track pans.

By G. T. DONAHUE
District Engineer
New York Central System
Cleveland, Ohio

FOR THE past four years, the New York Central System has been carrying out an extensive program of drainage improvements at several track-pan installations along its multiple-track high-speed main line between Buffalo, N.Y., and Chicago. This work was undertaken to provide a more effective means of disposing of the large quantity of overflow water from the pans, thereby preventing it from becoming a threat to the stability of the roadbed.

Briefly, the installation at each location embodies a system of longitudinal subsurface drains between the tracks, these being constructed of vitrified-clay, cradle-invert pipe placed below the level of the subgrade in trenches backfilled with coarse broken stone. Lateral drains are provided at intervals to convey the water from the inter-track drains to other longitudinal drains, or ditches, on each side of the roadbed. In addition, to conduct the overflow water to open-grate catch basins located at each lateral drain, gutters were constructed between the tracks, which are paved with precast concrete blocks, laid with open joints. The outside shoulders of the roadbed at each trackpan installation are paved with precast concrete blocks in a similar manner.

A Drainage Problem

The use of track pans to eliminate stops for water, while highly effective from an operations standpoint, has always resulted in a drainage problem for the maintenance forces. Locomotives that are designed for picking up water from pans are provided with a scoop, mounted under the tender and controlled by air pressure through valves in the engine cab. When the locomotive passes over the pan the scoop is lowered, causing the water to be forced upward through a chute and into the tender. Each time a locomotive takes water a relatively large volume of water is deposited over the track and roadbed. Some of this water is splashed out of the pan by the scoop.

To dispose of this overflow water a properly designed and installed drainage system is, obviously, of prime importance around track-pan installations. In the design of the drainage system serious study must be given to the proper elevation of the drainage pipe with respect to the track, the size of pipe, the gradation and size of porous backfill, the method of construction, and the selection of a type of drainage pipe that will function with maximum efficiency and require minimum maintenance expenditures.

The New York Central System's program for improving the drainage at track pans, which was started in 1944, has involved five locations between Buffalo and Chicago. At four of these five places there are four main tracks, each equipped with a track pan, and the same general system of drainage was chosen for each location. Four of the locations, namely, Silver Creek, N.Y., Westfield, N.Y., Springfield, Pa., and Painesville, Ohio, are on the Erie division, while the fifth installation—Lydick, Ind.—is on the Western division. The details given in this article, and the illustrations accompanying it, apply to the installation at Painesville.

In constructing the drainage system, longitudinal trenches were dug between the tracks for the entire length of the track pans, and the cradle-invert pipe, also commonly known as Skip pipe, was laid in each trench to exact grade. This type of pipe is prepared in 2-ft. lengths and is cast in a U-shaped section, with an integral top slab, or cradle, forming a cover over the top opening. Catch basins were provided at intervals of 160 ft., and the longitudinal drains were sloped to these basins from high points located midway between adjacent catch basins. The flow line of each drain at the high points is 4 ft. 10½ in. below the top of rail, while at the catch basins the flow line is 5 ft. 8 in. below the top of the rail. After the Skip pipe was installed each trench was backfilled with coarse broken stone to the elevation of the subgrade, above which it was filled with crushed stone ballast.

Details of the Pipe

The ever-present cinders and miscellaneous dirt to be found along the track made it necessary to select a pipe with openings for the entrance of water, but designed so as to minimize the danger of the openings becoming plugged by any cinders that might wash through the backfill and come in contact with the pipe. In each length of Skip pipe the under side of the cradle at the bell end is cut at an angle of 45 deg., while the top side of the cradle at the spigot end is also cut at this angle. Also, there is an arrangement of lugs at the bell end of each length so that, when the lengths are joined, a stransverse slot is formed in the cradle at each joint, providing an entrance through which any water that has collected on the cradle of the pipe will be discharged directly into it in the direction of the flow.

This movement of water is said to keep the transverse slots scoured clean. Another consideration is that the water which is collected on the cradle of the pipe exerts an hydraulic impulse as it enters the pipe, thereby resulting in an increase in the velocity of the water in the line.

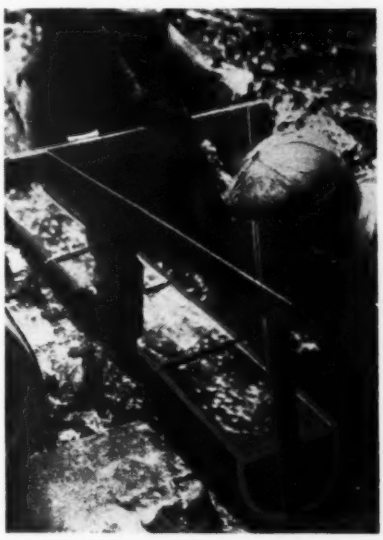
Another important feature of the new drainage installations on the New York Central System are the paved gutters that were provided between the tracks to collect the overflow surface water and convey it to the catch basins. The side slopes of the gutters are made of precast concrete blocks, 25 in. square and 4 in. thick, laid with open joints, while paving blocks, also laid with open joints, form the flow lines. These gutters are sloped from high points, midway between the catch basins, on a grade of 0.65 per cent. As indicated, the outside shoulders of the roadbed at each installation were also paved with the concrete blocks.

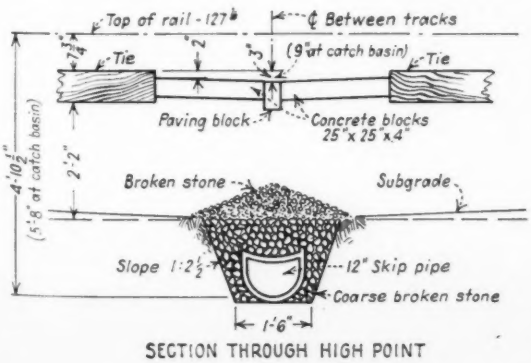
Despite the fact that the gutters are laid with open joints, they conduct a large percentage of the overflow water directly to the catch basins. Water that overflows outside of the gutter areas, and that which passes through the open joints between the gutter blocks, is conveyed rapidly through the ballast and broken-stone backfill directly to the Skip pipe. After reaching the catch basins, the water is carried through 12-in. lateral lines to the longitudinal drains, or ditches, outside of the tracks, and is conveyed by them to reclaim wells.

The installation at Westfield was completed in 1944, those at Silver Creek and Springfield in 1945, while the fourth installation, at Painesville, was completed during 1946. The drainage project at Lydick is now nearing completion. The results obtained at Silver Creek, Westfield and Springfield, the oldest of the installations, indicate that they continue to function perfectly.

The drainage systems were designed and installed by the engineering organization of the New York Central. The work was done under the supervision of F. H. Simpson, Engineer Maintenance of Way—New York Central System, Lines West, and the writer.

Above — The drainage pipe distributed along the track prior to installation. Below—Placing the pipe to exact grade line

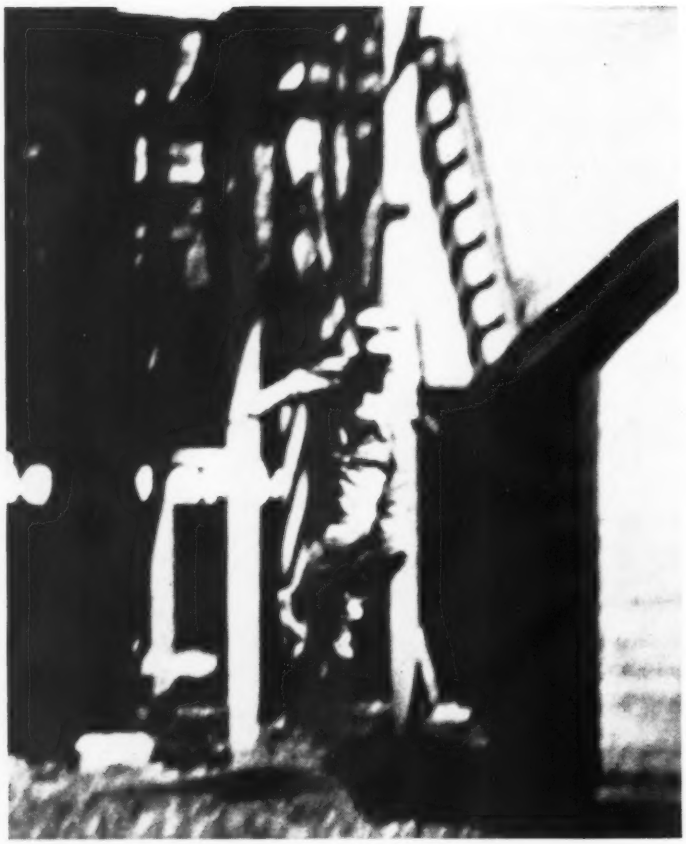




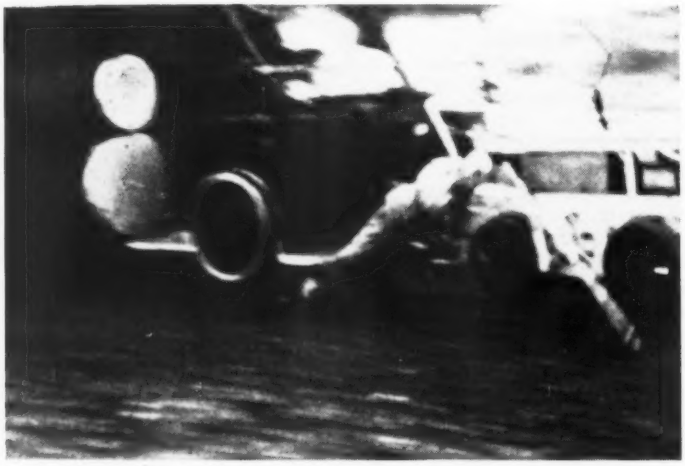
SECTION THROUGH HIGH POINT

Left—Typical cross section at high point in grade line of one of the longitudinal drains

Right—A completely-assembled section of one of the longitudinal drains, prior to backfilling



Shown above is a member of a carpenter gang, falling from an elevated scaffold. This man was working without the benefit of a properly secured railing on the scaffold and fell when a wrench, which he was using to tighten a nut, slipped and caused him to lose his balance. He fell to the roof of the small building at the right, landing on his back, before falling to the ground. He suffered a severe back injury. This accident serves to illustrate the seriousness of failing to observe safe working rules.



Above—This view depicts a telegraph and signal department employee who stopped his motor car on the main track while he did some repair work. His interest in his work, though commendable, made him forget that a train was due within a few minutes—a fact that he did not remember until the train came in sight a few hundred feet away. The man made a frantic attempt to move the car from the track, but his efforts were in vain and he lost his life when the locomotive struck the car. The fact that a dummy was used to re-enact the scene of the collision does not detract from the forcefulness of the picture in showing a man failure.

These Movies D

Scenes from Southern Pacific and Rio Grande safety films vividly portray results of carelessness and rules violation. Aim to teach and shock in putting over importance of avoiding unsafe practices

HOW to "drive safety home" among those in the far-flung forces of the roadway and structures departments has long been a matter of deepest concern to maintenance of way and safety officers. Almost innumerable methods have been tried, each with its contribution toward instilling safer methods and practices, but accidents, with serious casualties, still occur.

Latest among the "tools" to promote increased safety is the sound movie—which not only shows safe methods, but vivid action scenes of falls, motor car collisions and derailments, scaffold failures, bruised hands and feet, and head and eye injuries—each with an appropriate sound track designed to insure getting over the exact message intended.

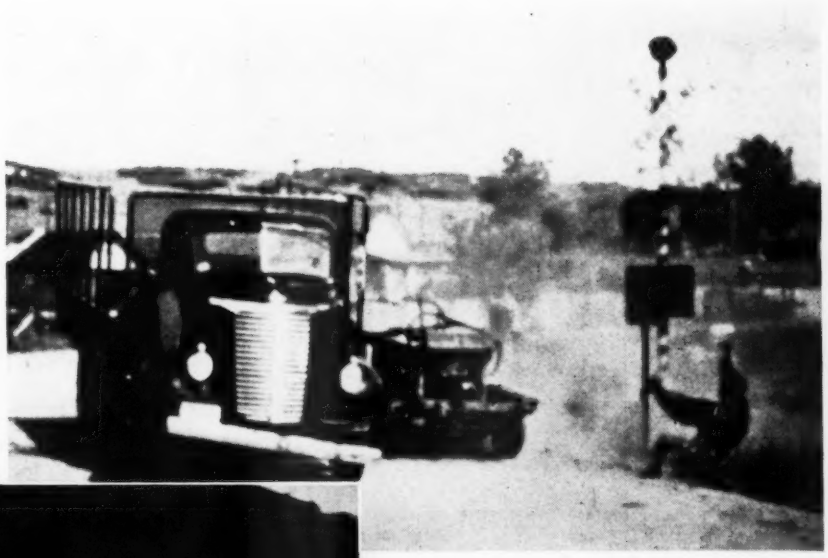
Two of the latest and most effective of these films are entitled "Maintenance of Way Mishaps," produced by the Southern Pacific, and "Use Your Head," produced by the Denver & Rio Grande Western. Scenes from these films are shown herewith—blurred somewhat by the dynamic action involved, but no less clear in portraying the seriousness of a range of common accidents—accidents that *will continue* until maintenance men are resolved, through rule observance, alertness, and eternal vigilance, to stop them.

Both films are being shown over the railroads involved wherever gangs, large or small, can be brought together—whether in section tool houses, outfit cars, station waiting rooms, schools, churches or division offices. The purpose of both films is "still greater safety among roadway and structures employees," and both are making a substantial contribution to that end.

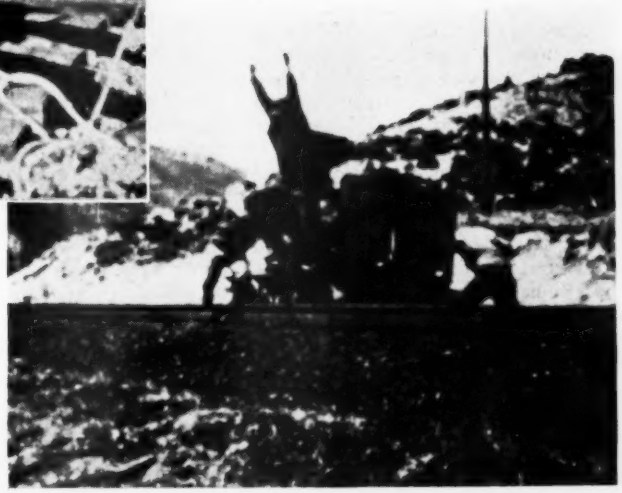
In addition to being shown widely on the roads which produced the films, they have been presented at conventions, club meetings and at gatherings of employees on other roads, both in the United States and Canada.

Dramatize Maintenance Accidents—and Their Serious Consequences

Right—Failure to reduce the speed of a motor car as it approached a highway grade crossing resulted in the collision, shown here, between the motor car and a highway truck. Several occupants of the car jumped before the accident occurred, but the operator remained on the car in an attempt to stop it and is shown at the right, being thrown head over heels to the side of the road.



Left—A complete understanding between all members of a gang as to how work is to be done is of great importance if serious accidents are to be avoided. Shown here is a man who was crushed beneath the members of a heavy tripod when it fell onto the track. The tripod, when in the erect position, had been braced with guy lines and these were being removed in preparation for dismantling it. This man noticed that a chain hoist was still in position on the tripod and climbed to the top to remove it. While he was doing this, his fellow workers disengaged one of the guy lines and the tripod fell to the ground carrying the man with it.



Right—A clawbar that was carelessly and insecurely loaded on this motor car was responsible for its derailment when the car was traveling at a high rate of speed. The clawbar slipped from the front end of the car and was struck by one of the wheels. The occupants of the car were thrown to the ground or attempted to jump to safety. Nearly all were hurt, but none of them, fortunately, were hurt seriously. Section foremen must be impressed with the importance of the safety rules governing the loading of tools on motor cars and trailers.

How To Get Better Concrete—

Selection of Materials

No. II of a Series

By A. J. BOASE

Manager, Structural Bureau
Portland Cement Association

This is the second of a series of five articles prepared for *Railway Engineering and Maintenance* in the interest of helping the railroads, and especially those in the field, secure sound, durable and economical concrete. This installment discusses the various available types of cement for specific purposes, including air-entraining cement; the qualifications of coarse and fine aggregates; the effect of aggregate shape and size; the reaction between certain aggregate materials and the alkalies in cement; and shrinkage of concrete.

A ballastless deck slab bridge on the Grand Trunk Western at Flint, Mich. Exposures are severe and appearance is important. Suitable materials, properly used, were essential to meet both of these requirements

GOOD materials are essential for the production of durable concrete. The final properties of the hardened concrete are so dependent on the quality of the materials used in its making that every precaution should be taken to select only those materials having good service records or which can be shown by tests to be acceptable. Too often the inspection and selection of materials are left to someone who has no knowledge or appreciation of the effects of the materials used on the qualities of the finished structure. To select the proper materials is to help insure a sound, durable structure.

Types of Cement

Portland cement is made to meet the standard specifications of the American Society for Testing Materials and the requirements of federal specifications. The present standard specifications cover five types of cement, designated by numbers from I to V.

Type I cement is the normal portland cement intended for use in general concrete construction when the special properties of the other types are not required. It is the type most generally used and is supplied by the dealer unless the order calls for one of the other types.

Type II is a modified portland cement intended for use in general concrete construction exposed to moderate sulfate action or where moderate heat of hydration is required. In certain areas, such as the Dakotas, Montana, Wyoming and Colorado, the soils and waters carry various amounts of sulfates. Where it is not practical to protect the concrete, Type II cement can be used where there are moderate amounts of the sulfates and Type V cement where the sulfates are more concentrated. Type II cement is also used in semi-mass work, such as heavy bridge piers, heavy retaining walls, dams of moderate section, and work where it is desirable to keep the rate of heat generation relatively low. In cold weather construction, however, it may be desirable to use cement that generates more heat as an added precaution against the effects of low temperatures.

Whether Type I or Type II cement should be used, so far as heat generated is concerned, depends on both size of members and on weather conditions. The rate at which strength increases is slower for Type II than for Type I. Under average conditions the strength of concrete at three days with Type II cement is about 75 per cent of the strength secured with Type I cement in the same period; at 28 days it is about 85 per cent, and at three months the strengths are about equal. In the period of shortages during and since the war it has been difficult to provide adequate manufacturing, storage and shipping facilities to produce and handle all of the standard types of cement so that Type II cement has not been generally available, except on special order.

Type III cement is high-early-strength portland cement intended for

use where it is desired to produce a very high strength at the early ages, as in structures to be used as quickly as possible; where it is desired to reuse the forms quickly; or where it is desired to reduce to the minimum the time of protection in cold-weather construction. Concrete mixtures in which high-early-strength cement is used remain plastic about the same length of time as those in which normal cement is used, so that it is not correct to say that it is quick-setting cement. Once the mixture solidifies, however, the strength increases rapidly. In general, the strengths obtained with high-early-strength cement in one day are about equivalent to those at three days with normal cement; three-day strengths are about equivalent to seven-day strengths with normal cement; and seven-day strengths are about equivalent to those obtained at 28 days with normal cement. Type III cement is generally available and stocked by dealers.

Type IV is low-heat portland cement and is intended for use where low heat of hydration is required. Its use has been confined to large massive structures, such as the large dams constructed by the Tennessee Valley Authority and the U.S. Bureau of Reclamation. This type is not generally available.

Type V is sulfate-resisting portland cement for use where high sulfate resistance is required, as in some of our western states where soils and waters carry large amounts of sulfates. It is generally not carried in stock.

Air-Entraining Cement

The A.S.T.M. has recently adopted a tentative specification covering two types of air-entraining portland cement. These types correspond to Types I and II, except that an agent is incorporated which produces entrained air in the concrete mixture in the form of millions of minute air bubbles. This cement was originally developed for use in pavements to prevent scaling of the surfaces due to freezing and thawing, combined with the action of salts used for the removal of ice. However, with the proper amount of air a more durable concrete for exposure to freezing and thawing is produced, even where there is no salt action and, therefore, its use is being extended into the structural field and for general purposes in northern United States. The entrained air results in concrete of better workability, with less tendency to segregate, and there is less bleeding of water to the surfaces. Thus there is less chance for construction defects, which are often the cause of early deterioration upon exposure to severe weathering.

A minimum of about 3 per cent air is required to accomplish the desired results but, to provide some leeway, specifications usually require not less than 3 nor more than 6 per cent. The upper limit is specified because there is a slight reduction in strength due to each percentage increase in air, without further benefit in durability. When air content is limited to the above percentages, the reduction in strength usually is not more than 10 to 15 per cent, and where the amounts of water and fine aggregate are reduced by taking full advantage of the improved workability, the strength reduction is usually less.

Dealers do not always have air-entraining portland cement in stock. In lieu of such cement an air-entraining admixture can be used, adding this at the mixer. Tests for air content, a number of which have been developed,* should be made to be sure that neither too little nor too much air is entrained.

Water used for mixing concrete should be reasonably free of acids and alkalies. With few exceptions, water that is suitable for drinking is also suitable for mixing concrete. For the sake of appearance, water used for curing should be free of substances such as iron that may stain the concrete.

Aggregates

The A.S.T.M. specifications give requirements as to cleanness, soundness, strength and grading of aggregates. For concrete exposed to severe weathering, it is important that the aggregates be weather resistant. One

*A. S. T. M. Standard C138-44. See also Journal, American Concrete Institute, May, 1947.

Two culverts built at the same time by the same contractor under identical conditions and with the same materials, except the coarse aggregate. The structure below has coarse aggregate which proved to be unsound. The one above has sound coarse aggregate

Erected in 1900, the station of the Northern Pacific at Bismarck, N. D., is probably the first station built of exposed concrete. It was placed in 10-in. lifts and the surfaces were brushed to expose the marble aggregate. It remains in excellent condition

of the best guides to the suitability of an aggregate from this standpoint is its past performance under similar conditions. Usually, washed and screened materials from a commercial plant are available, and in most cases they have been used for some years. An inspection of structures in which certain aggregates have been used will give a good indication of their soundness. Other large users of the aggregates in question may be consulted. State highway departments, particularly, have fairly complete records of projects where local materials have been used, and most of the states are willing to furnish information regarding their performance.

Particles Should Be Hard

Aggregates may be sand and gravel of river or glacial deposits, crushed stone, crushed blast furnace slag or other artificially produced materials. Sand and gravel deposits usually contain many types of rock and the proportions of the different types may vary considerably in different parts of the deposit. For most purposes the aggregate particles should be hard, tough and dense. The igneous rocks and the hard, dense limestones and sandstones make good aggregates. Care should be exercised to avoid the soft, porous sandstones for use where resistance to weathering and abrasion are important. The presence of clay in limestones and sandstones should be guarded against.

Marbles and quartzites usually make good aggregates. On the other hand, most shales and conglomerates are not suitable. Many cherts have given poor service, and unless a cherty material has a good service record it should not be used until it can be investigated carefully. High absorption and low specific gravity of cherty materials usually may be taken as warning signals of unsatisfactory resistance to weathering. Rocks which break up into thin laminations are usually too brittle and are objectionable also because of the particle shapes. Slates and some of the rocks classified as schist or gneiss have these characteristics.

Lightweight Concrete

Some of the softer, more porous rocks, such as tufa, pumice, lava and expanded mica are used to produce lightweight concrete. The strengths produced with these materials are usually lower than obtained with the harder, stronger aggregates. Other materials used for lightweight concrete are blast furnace slag, expanded blast furnace slag, and burned clay and shale.

The type of aggregate influences the thermal coefficient of the concrete, and consequently affects the amount of expansion and contraction due to changes in temperature. This is indicated in the following table showing results of tests in which all factors except kind of aggregate were the same:

Kind of Aggregate	*Coefficient of Expansion per 1 deg. F.*
Quartz	0.0000066
Sandstone	0.0000065
Gravel	0.0000060
Granite	0.0000053
Basalt	0.0000048
Limestone	0.0000038

The tests referred to were made on only one limestone, which probably had a low coefficient. The coefficient varies for different limestones, some being as high as the siliceous materials. In the tests the fine aggregate was of the same material as the coarse aggregate. Where the fine aggregate is of one material and the coarse aggregate is of another the coefficient would be affected accordingly.

As stated previously, the most reliable criterion for judging the suitability of an aggregate is its service record. In the absence of such record one must rely on tests. The sodium sulfate or magnesium sulfate test made in accordance with A.S.T.M. standards is most often used for determination of physical soundness. The aggregate particles are put through cycles of soaking in the salt solution and drying in an oven, the expansive force of crystallization of the salt simulating the action that obtains when the particles are subjected to freezing and thawing. Freezing and thawing tests of the aggregate alone, or of concrete in which they are incorporated, are made in some cases.

Alkali Reaction

In recent years considerable publicity has been given to the reaction between certain aggregate materials and the alkalies in cement, resulting in expansion and cracking. While the problem is very real where it exists, there has been a tendency to blame alkali-aggregate reaction for many ills resulting from other causes. Investigators seem well agreed that certain types of silica react with the alkali (Na_2O and K_2O) present in cements, forming new compounds accompanied by expansion. Usually the reactions are slow, often requiring several years before there is noticeable change in the

concrete. The most active materials are amorphous, hydrous (opaline) silicas. Most of the difficulties traceable to this source have been reported from the western part of the United States. There is no quick test to determine the suitability of aggregate from this standpoint, although petrographic analyses detect suspected constituents and permit comparisons with materials having good and bad performance records.

Some authorities believe that limiting the alkali in cement to 0.6 per cent will permit the use of aggregate containing reactive materials. The federal specifications for portland cement carry a provision that where the purchaser specifies "low-alkali cement," the per cent of $Na_2O + 0.658$ per cent of the K_2O shall not exceed 0.6. The best practice is to avoid aggregate known to be reactive, insofar as this is economically possible. For the normal condition of non-reactive aggregates there is no evidence that alkali content of the cement is a factor in durability of concrete.

Effect of Aggregate Size

Aggregates graded up to large sizes require less paste to coat them and fill the spaces between particles than aggregates of smaller size, and consequently are more economical. This is readily appreciated since, if a large

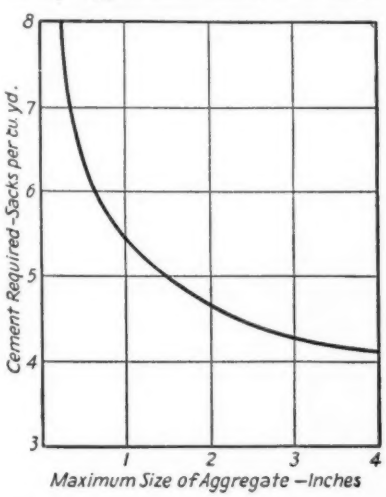


Fig. 6—As maximum size of aggregate increases, the cement required for a given consistency and water content decreases. This is shown by above curve which represents concrete of 3 to 5-in. slump and 6½ gal. of mixing water per sack of cement

aggregate particle is broken into several smaller pieces, new surfaces will be exposed which must be thoroughly coated with the paste, yet the volume of the aggregate has not been increased. How this affects the amount of cement required is shown in Fig. 6—for concrete made with 6½ gal. of mixing water per sack of cement with a consistency represented by a slump of 3 to 5 in.

It is seen at a glance that as the maximum size of aggregate increases, the amount of cement required to produce a given quantity of concrete decreases. In many instances, ¾-in. aggregate is used when 1½-in. aggregate could be used just as well, with a saving of 7/10 sack of cement per cubic yard of concrete. It follows, of course, that with a given amount of cement, concrete of better quality is produced with the larger aggregate. This is because less mixing water is required with the larger aggregate than with smaller aggregate, as is brought out in Fig. 7. Here it is shown that for a given cement content and consistency, 2-in. aggregate requires at least a gallon of water per sack of cement less than is required by 1-in. aggregate.

Sand

The grading of the aggregate, particularly the grading of the sand, also affects the amount of paste, and consequently the amount of cement required. An over-abundance of any one size should be avoided. Generally the sand should not contain more than 35 per cent of any one size when separated by the standard sieves. It is important also that the sand contain not less than 2 to 10 per cent passing the No. 100 sieve and 10 to 30 per cent passing the No. 50 sieve. These fine particles are necessary for good workability in the usual concrete mixtures. The amounts may be nearer the lower limits with rich mixes and nearer the upper limits with the leaner mixes.

While improvements have been made in washing equipment to prevent washing away the fines, they are still being removed at many plants. Where this practice prevails it may be necessary to add a sufficient quantity of fines to produce the desired grading. Some plants blend fines into the washed sand; in other cases it is necessary to add the fines at the job. This should be done by handling it as a separate aggregate, adding the proper amount to each batch of concrete.

Floor Topping Mixtures

Floor topping mixtures present a special case in which it is not desirable to have as much of these fine particles present. Here, it is possible to get along with less because the method of placement used does not require the degree of workability necessary for concrete placed in forms. In this case not more than 5 per cent of the sand should pass a No. 100 sieve and not more than 15 per cent should pass a No. 50 sieve.

The shape of aggregate particles affects the workability of concrete and the proportions of materials that can be used. Long, slivery particles and flat particles are harsh working and require more paste and more of the fine aggregate to produce workable

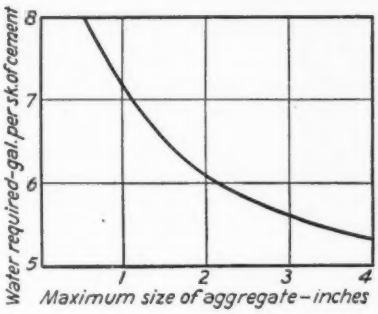


Fig. 7—As maximum size of aggregate increases, the water required with constant cement factor and consistency decreases. This curve represents concrete of 3 to 5-in. slump with 5 sacks of cement per yard

concrete. As a result, they require more cement than more rounded particles. Crushing machinery has been improved which, when used to crush a suitable quarry stone, produces aggregate having well-shaped cubical particles. In general, somewhat more fine aggregate and less coarse aggregate must be used with crushed materials than with rounded materials in order to provide comparable workability.

Shrinkage

Concrete made with large, well-graded aggregate has less shrinkage due to drying and, therefore, less tendency to crack than concrete containing smaller aggregate. This is because of the smaller quantity of paste required per unit volume of concrete. It has been estimated that for a given consistency and strength, concrete made with 1½-in. aggregate has drying shrinkage about 30 per cent less than that made with ¾-in. aggregate, and with 2-in. aggregate the shrinkage is about 40 per cent less than with ¾-in. aggregate.

It is evident from the foregoing discussion that the care with which materials are selected affects not only the quality of the concrete but also its economy. Selection of well-graded, sound aggregates and cement suitable for the work at hand is the first step in building durable concrete structures. The next article in this series will discuss design of the concrete mix.

Off-track weed burner in operation on Gulf Coast Lines of Missouri Pacific

Off-Track Weed Burner

THE Missouri Pacific Lines in Texas and Louisiana, which for many years has been burning weeds in and along the track as the most important part of its weed control program, has supplemented its regular on-track burning equipment and off-track weed mowers with an off-track weed burner.* This machine, consisting of a Woolery weed burner, (developed originally for farm use in burning potato tops), can be mounted either on the end of a truck or on a two-wheel trailer towed by a tractor. When mounted on a truck, fuel is supplied from drums placed on the truck bed, and when used on a trailer, as shown in the above illustration, fuel is supplied from a 170-gal. tank.

The burner is powered by a 12-hp. Onan air-cooled engine and has three adjustable burners which may be raised or lowered, or moved from side to side. The tractor used to tow the burner—a Model B Allis-Chalmers unit—may also be equipped with a mowing attachment, small angle dozer, or used to tow a plow for plowing fire guards—thus giving it a considerable range of versatility when not used in burning operations.

Three Adjustable Burners

The off-track burner unit can be operated successfully only on reasonably smooth right-of-way. It cannot be used on rough terrain and is not too successful in burning areas on embankment slopes and shoulders unless the embankment is relatively low. However, in most areas it can be used to burn weeds directly up to the ballast shoulder on each side, and even over the track area itself, thus minimizing the necessity of using the on-track burners in these areas. One of the most effective uses of this equipment is in burning weeds around station grounds and yards.

Since weeds and grasses in most of the territory served by the Missouri Pacific in Texas and Louisiana are continuously green until after the first heavy frost, fire will not spread readily and is easily controlled by two or three section laborers, equipped with portable extinguishers, who follow the machine.

*A detailed description of weed control on the Missouri Pacific in Texas and Louisiana appeared in *Railway Engineering & Maintenance* for April, 1946.

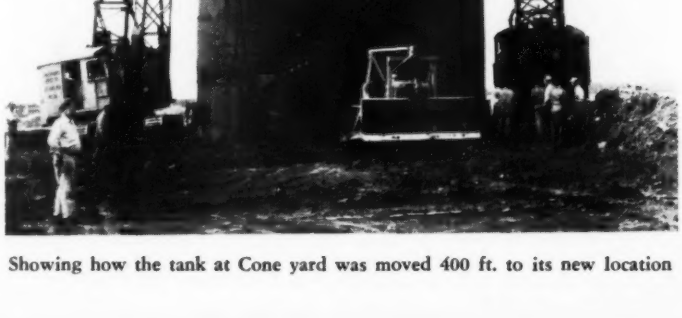
Move Large Water Tank

WHEN the Baltimore & Ohio recently reconstructed its Cone yard at East St. Louis, Ill., it was necessary to move a 250,000-gal. water tank approximately 400 ft. to a new location.

Before moving the tank, four steel lifting plates, each 2 ft. square and 1 in. thick, were welded to the wall of the tank at quarter points around its circumference, near the bottom. To each of these plates was welded an "ear" consisting of a 1¼-in. plate.

Two Northwest crawler cranes, one with a 65-ft. boom and another with a 70-ft. boom, placed on opposite sides of the tank, were used to lift and carry it to its new location. The lift by each crane was made by means of a cable sling, secured to the lifting plates on the opposite sides of the tank. Thus, the tank was supported between the two cranes in a "basket" arrangement.

In moving the tank it was raised only a foot or so above the ground. A Caterpillar D7 bulldozer was brought into use to assist the movement where rough ground was encountered. The bulldozer was also used in positioning the tank exactly on its new foundation. The work of moving the tank required three days.



Showing how the tank at Cone yard was moved 400 ft. to its new location

Flame Cleaning— A Tool for the B. & B. Forces

The flame-cleaning of railway structures in preparation for painting them has been steadily gaining in acceptance for a number of years. With the thought of advancing the knowledge of this practice—its advantages, the principle on which it is based, the equipment employed, and the applications of the process in the field—we present the accompanying article. This consists of a report presented before the recent convention of the American Railway Engineering Association, and supplementary material describing specific field applications of the process.

The Procedure and Equipment*

THE flame-cleaning of steel requires a quick and intense heat that will produce a steep thermal gradient between the scale and the parent metal and thereby cause the scale and other surface material to expand rapidly and separate from the parent metal. A slow heat will cause a fusion instead of a separation. The oxyacetylene flame has been found to be best adapted and most generally used for this purpose.

Various types and sizes of descaling heads are available, but those best adapted are flat and vary from 2 to 8 in. in width, the 4-in. head being more generally used. The wider heads are used on large flat surfaces to be cleaned, while the narrower heads are used on smaller members and in corners and other close places. These cleaning heads have ports, No. 75 drill size, that are 0.002 in. in diameter. Even with such small port holes the velocity is so high that the flames are over ¼ in. long. It is important that the flame tips be kept at a uniform distance from the surface to be cleaned. To this end, the wide heads are provided with skids made of extremely hard and heat-resistant alloys such as Stellite. For best results, the flame is directed to the surface to be cleaned at an angle of about 60 deg. The heads are attached to standard welding blowpipes by means of extension arms.

In addition to the necessary oxygen and acetylene manifolds with connections, the equipment required for a two-torch operation, including necessary reserves, is as follows:

2—nuts
2—150-ft. sections of ¼-in. twin hose (with connections)
4—hose splicers
3—oxygen regulators
3—acetylene regulators
3—welding torches
4—mixing heads
3—12-in. straight extensions
3—16-in. angular extensions
3—18-in. straight extensions
4—round descaling tips
2—4-in. flat descaling tips
3—adapters
3—5-way wrenches
3—spark lighters
12—spark lighter flints
3—pairs goggles
6—pairs asbestos safety gloves
2—pairs safety sleeves
2—safety aprons
6—No. 75 drill bits

Flame-cleaning and dehydration causes the surface material that is not blown clear by the torch to be left dry so that such material can easily be removed with a power-driven wire brush. Painting should follow the flame-cleaning operation as closely as practicable before the material completely cools and gathers moisture and rust.

Flame-cleaning is more economical than sand blasting, particularly for jobs out on the line, because the apparatus can be handled more conveniently to and from the job than the heavy compressors and sand required for the blasting work. Also, it eliminates the undesirable fogging of dust from the sand operation on to painted areas and over clean sections which would otherwise require reblowing and cleaning in advance of painting.

Two Jobs on the C.N.R.

The flame-cleaning of steel bridges prior to painting them is a practice that has been employed extensively on the Canadian National since about 1941. Among the large flame-cleaning jobs that have been carried out recently is one involving a bridge that carries the main line of the company across the Chaudiere river at Charny, Que. This is a 1,000-ft. single-track, deck-plate girder bridge on masonry piers, consisting of 10 spans each 99 ft. in length.

Recently it was decided to paint the bridge throughout and to precede the work by a thorough job of cleaning. Since a total of nearly 50,000 sq. ft. of surface was involved, of which many areas were deeply corroded, it is evident that the bridge and building forces of the road were confronted with a project of considerable magnitude. It was estimated that a gang of six men, working a standard eight-hour day, would require upwards of 10 weeks to clean the bridge with chisels and wire brushes, and another

* Adapted from a report prepared by a subcommittee of the committee on Maintenance of Way Work Equipment of the A.R.E.A. T. M. Pitman, division engineer, Illinois Central, was chairman of the subcommittee.

four weeks to paint it, a total of 14 weeks. Using sand blasting for the cleaning operation it was estimated that a total of about 12 weeks would be required for the work. Furthermore, using these methods, bridge cleaning and painting work, because of climatic conditions, must be done in Quebec between June 1 and September 15—and hence practically the entire summer season would have been required to do the work.

Savings by Flame Cleaning

On the other hand, using the flame-cleaning process it was estimated that the entire job of cleaning and painting the bridge could be completed in about eight weeks, with corresponding savings in the cost of doing the work. It was also estimated that the use of the flame-cleaning process would permit a saving of 20 per cent in the amount of paint required for the job, this saving being realized because the paint would be applied to a warm surface. On the basis of this reasoning it was decided to do the cleaning work with the oxyacetylene flame.

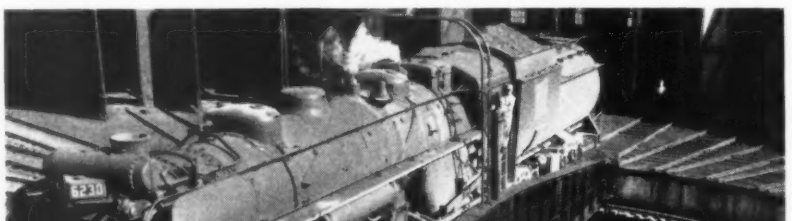
In performing the cleaning work standard welding equipment was used, with the addition of heads correctly designed for flame-cleaning work. These heads were attached by extension arms to ordinary welding blowpipes. Three widths of heads were used—a 6-in. type for broad surfaces, a 4-in. head for work between ties, and a single-flame nozzle for use in close corners and close quarters generally.

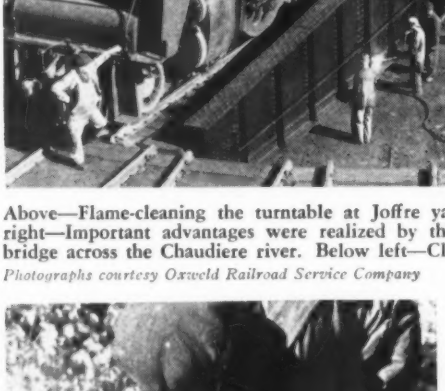
This project was carried out under the direct supervision of Edward Piton, bridge and building master. In discussing the work Mr. Piton pointed out that the former bridge-maintenance season of four months in Quebec has now been more than doubled on jobs where flame-cleaning can be used. He also pointed out that the experienced bridge workers under his supervision were able to learn to use the flame-cleaning heads in less than half an hour.

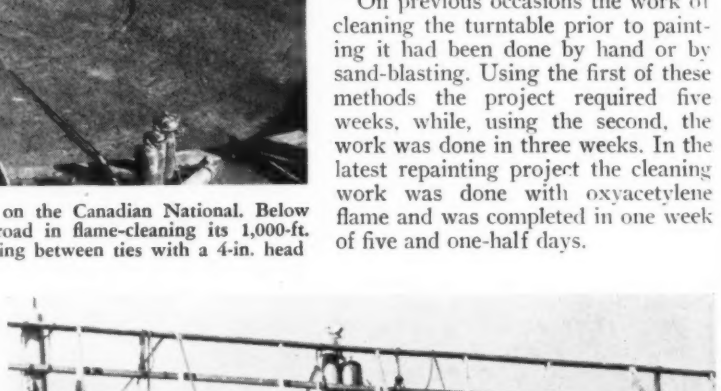
Cleaning a Turntable

Another cleaning job that was carried out recently on the Canadian National involves the turntable at Joffre yard, which is located about eight miles from Quebec, Que., on the company's main line between Montreal, Que., and Halifax, N.S. The turntable here is 85 ft. in length and is of the half-through plate-girder, balanced type, and was installed in 1920. Because of the difficult conditions prevailing at this location, it had been necessary to paint this turntable at comparatively short intervals, with the most recent job of repainting being carried out in the late summer of 1947.

On previous occasions the work of cleaning the turntable prior to painting it had been done by hand or by sand-blasting. Using the first of these methods the project required five weeks, while, using the second, the work was done in three weeks. In the latest repainting project the cleaning work was done with oxyacetylene flame and was completed in one week of five and one-half days.





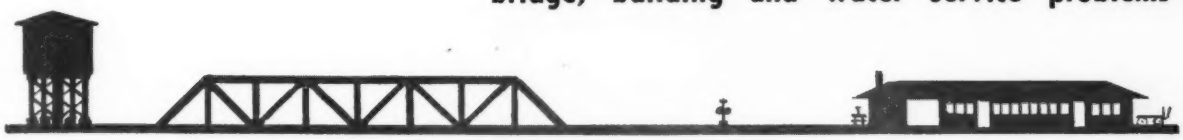


Above—Flame-cleaning the turntable at Joffre yard on the Canadian National. Below right—Important advantages were realized by this road in flame-cleaning its 1,000-ft. bridge across the Chaudiere river. Below left—Cleaning between ties with a 4-in. head

Photographs courtesy Oxweld Railroad Service Company

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



Ways of Sighting Track Raises

When raising track should the foreman sight toward track that has been tamped, or away from it? How do these procedures differ? What are their relative advantages?

Don't Look Back

By Track Supervisor

Before consideration is given to the method to be used in sighting track that is being raised, certain standards must be made uniform as criteria on which to provide a basis for comparison. To provide uniform grade, the raising should be done with the use of the spot board or to grade stakes established by instrument. The work should be done with a minimum of six jacks, and preferably more, depending upon the size of the gang handling the raise, the speed of the work, the extent of tie renewals, and the density of traffic.

Using the spot board, the sight block should be at least two jack spaces (or one rail length) from the jack currently being raised, to prevent the stiffening effect of the rail being raised from affecting the established sight point. Many experienced foremen neglect this principle and get a resulting poor grade and surface to their raise. Once the grade for jack locations is established, any intermediate differences can be ironed out by continuing to sight ahead. The tampers must, however, be kept behind the sight location at all times.

Differences resulting from surface-bent rails would be the singular requirement deviating from the rule to sight ahead during the progress of the raise. When such conditions are noted, it is necessary to sight back and set jacks accordingly in the low spots, but only after the tampers have worked the ties in the location of the original grade setting. By raising the low spot caused by a bend, the already-tamped portion of the rail will become high, and will be permitted to hang, so that its surface under load will still be uniform and the bent condition of the rail will be unnoticed. Constant use of the method of raising by having the foreman sight "backward" or toward the track that has been tamped would too easily permit errors in surface caused by trying to cope with the bent rail conditions in the actual raise, rather than in the method specified here.

It is necessary, of course, to sight back upon the previous day's raise to choose a point of uniform surface in the rail on which to set the sight block from which to sight ahead for the current day's raise. Any changes in that surface must be made before the sight block is used. Once a sight block is used at a location, its surface must not be changed without changing all subsequent jack-raising elevations. The best grade can be obtained at all times by sighting ahead, or away from the track that has been tamped, with only an occasional check upon the actual surface of the rail behind to assure a smooth top. Too little emphasis is placed upon a good grade.

Sights From Tamped Track

By William Lindsey

Extra Gang Foreman, Chicago & Illinois Midland, Springfield, Ill.

When raising track, I have always found that it is best to sight away from track that has been tamped,

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To Be Answered In the July Issue

1. *When sawing ties in track during tie renewal operations, can the sawing on one or both sides be carried out a considerable distance in advance of actual renewals? How far? Explain.*

2. *What precautions are necessary when installing glass blocks as exterior walls or windows to insure watertightness under all weather conditions? Explain.*

3. *In territories where labor is scarce, is it practicable to recruit men at central points where labor is plentiful, and move them out on the line daily by truck or work train? Explain. How long a movement is practicable? Is this better than establishing camp outfits? Why?*

4. *What are the advantages and disadvantages of definitely assigning laborers to bridge and building gangs, compared with the practice of calling upon the track forces for such help? Explain.*

5. *To what extent can aerial surveys be used to plan grade separations, line revisions, or other improvement projects? What are their advantages? What are their limitations?*

6. *Why must oxygen be removed from the feedwater used in the steam generators of Diesel locomotives? Should this water be deaerated on the locomotives? If so, how?*

7. *To what extent is it practicable to shift work equipment from one territory to another with changing seasons in order to keep it busy a maximum number of days during the year? Explain. Do some types of equipment lend themselves better to this than others? What types? Why?*

8. *Does there come a time in the life of building siding when, because of appearance or deterioration, it is more practicable or desirable to renew it in kind or with other material than attempt patching, cleaning and repainting? What are the considerations involved?*

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

rather than toward it. Bluntly speaking, I think you are doing the job backwards if you look back toward the track that has already been tamped. However, I will grant that there can be a few exceptions. One is a bridge, and another is a highway crossing that has been previously raised so as not to retard the surfacing gang when they approach it. You can "back up" on these spots, and sight from them back toward your track already tamped and do work that is as acceptable as that obtained when sighting from tamped track. Another location where it is better to alter your procedure is at a sink or sunken spot. In most cases you can pick out stabilized track each side of the sink that is on a true level with the rest of your track, and raise to it. In this case I can see no distinct advantage or disadvantage either way.

In general, however, in sighting away from tamped track, your work is always in front of you, and your vision is not impaired greatly. Another advantage is that you are in the middle of things, so to speak. You can do the work ahead, while watching the tampers behind you. In these days of a vast number of inexperienced men, that is an important item.

In raising track, you have to keep in mind three spots, all of which, before the operation is complete, have to be brought up to a common level with each other. They are: (1) The sighting spot; (2) the spot which you are raising; and (3) the spot toward which you are sighting. Before number two can be brought up to level, number one and three must be already at that level, number three in this case being the extent of your raise carried forward, as the spot toward which you are looking. Perhaps you could reverse yourself and use number three as a sighting spot, but I will take number one, if for no other reasons than that it is going forward, and your work lies ahead of you, in which position you can furnish better supervision.

Disinfestation of Camp Cars

What methods can be used to control vermin in camp cars which are in service? Should the same methods be used when the cars are out of service? What insecticides or fumigants are most effective? What precautions are necessary?

Thinks DDT is Best

By D. C. Teal
Safety Engineer, Chesapeake & Ohio, Richmond, Va.

In general, the control of vermin in camp cars which are in service has consisted, in the past, of: (1) The screening of door and window openings; (2) daily use of insect sprays and repellents; and (3) fumigation of cars with gaseous cyanogen compounds during weekends when the men are absent. Although somewhat dangerous to use, hydrocyanic-gas fumigation was for many years the favorite method of suppressing bed bugs, rats and roaches because of its efficiency and the absence of bad after effects. Owing to the safety hazard involved, it was common practice to issue a circular letter or directive containing instructions on how the gas should be applied and enumerating all the precautions that should be taken. These rules also usually required the presence of a safety inspector.

In late 1945 there became available to the public the new war developed insecticide dichlorodiphenyl-trichloroethane, popularly known as DDT, which has the remarkable ability to kill a wide variety of pest insects, even when applied in very small quantities. It is also unique in that it will kill many insects that walk on it, weeks or months after it has been applied to the surface.

After considerable study of literature put out by the U. S. Public Health Service and other governmental agencies, and from personal experimental research work, I believe that DDT is superior to any other agent for controlling insects in camp cars—particularly bed bugs. The following reasons may be given for this belief:

(1) One application of DDT will greatly inhibit the activities of pest insects for from two to four months, whereas most other types of insecticides or fumigants are effective for but a few weeks.

(2) The use of DDT is not particularly dangerous to humans, as is the case with all gas fumigants.

(3) DDT is easier to apply and less expensive than most other insecticides. Its application does not require that the car be vacated, whereas gas fumigation precludes occupancy for at least 24 hr.

The DDT insecticide itself is a fine, white crystalline powder. It is almost insoluble in water but is soluble in kerosene, xylene, fuel oil, etc., and can be used in a number of forms such as oil solutions, suspensions in water, water emulsions and diluted in dusts or in smoke. For use in camp car work a 5 per cent DDT spray or a 10 per cent DDT powder is recommended.

The following precautions should be observed while working with DDT:

(1) Premises should be vacated except for people engaged in the disinfecting work. Doors and windows should be open.

(2) Kill all fires in the building. Do not smoke or light matches while working with liquid DDT.

(3) Wear respirators, goggles and rubber gloves while spraying.

(4) Wear clothing that will protect the skin. Roll shirt sleeves down. Wear a hat, etc.

(5) Avoid getting spray on persons if possible.

(6) Do not allow DDT to contaminate food and water. Keep spray or powder from getting into food, into water used either for drinking or for washing dishes, or on plates, cutlery, cooking equipment, etc.

(7) Wash face, hands and arms with soap and water after working with DDT in either form.

Although easy to apply, the assembly and care of DDT spraying equipment, preparation of the solution, technique of spraying, etc., require a certain know-how and should be done by trained personnel. The technique of spraying, description of equipment required, etc., are outlined in many trade and Public Health publications. Probably the one best adapted to camp car service is an eleven-page circular entitled "Use of DDT—Interstate Carriers, Land and Air", issued under date of May 1, 1947, by the U. S. Public Health Service, Sanitary Engineering Division, Washington, D. C. This may be purchased for ten cents.

New Methods Effective

By Anne Zeller
The Tanglefoot Company, Grand Rapids, Mich.

Heretofore the control of vermin in camp cars has been bothersome and expensive. Just when all cars had been completely fumigated and everyone was sure all pests had been eliminated, new insects would appear to reinfest the whole camp. Under most such circumstances, the job of

maintaining sanitary conditions was never ended.

New impetus was given to the use of insecticides during the recent war and great notoriety resulted for some of the effective dispensing methods used by the armed services. One of the most significant facts learned from this intensified use of insecticides was that one of the most effective methods of applying insecticides is in a mist of some sort—regardless of what chemical is used.

In our study of this problem, we have learned that by using a three-nozzle sprayer, attached to a can of insecticide, and a ⅓-hp. air compressor driven by a small electric motor, we can fill a camp car with insecticide mist in about one minute. Insects which hide in cracks are forced out by the mist and killed so quickly that prompt disposal of "floored" bugs is not necessary. In as much as the spray penetrates cracks and crevices, it is not necessary to carry the sprayer around to point it at the so-call "trouble spots".

We have found that a combination of insecticides is most effective for places like camp cars. The chemicals which we use with our equipment under a proprietary name are harmless to humans, and can be used whenever it is convenient, whether the cars or bunkhouses are occupied or not. In fact, foods and dishes need not be covered up as the insecticide will not taint food, stain dishes nor leave any odor. With such insecticides and such handy methods of dispensing them, the control of insects in camp cars is no longer expensive or a nuisance.

Hot Fog Penetrates

By W. S. Gilpin
Fog Incorporated, Chicago

Due to the introduction of more lethal, non-toxic chemicals, together with an improved method of application, significant advances have been made in the control of insect pests and vermin. Applied in the railroad industry this new technique provides a safe and economical method for the disinfestation of all types of cars regardless of whether they are in or out of service, whether they provide human habitation or the transportation of grains, etc., or whether they are food dispensing cars or not.

Not only were the older methods more costly but they also involved much that was objectionable—the possible danger to personnel that was always present during fumigation, the messiness and potential hazards of certain insect powders, the necessity of placing cars out of service, and finally, but not least, the lack of residual insecticide required to halt new infestations.

The chemical industry has made great strides in the development of insecticides during recent years. Consequentliy, chemicals are now available which are extremely lethal to insect life, which leave a residual deposit and are non-toxic to human beings. These chemicals are mainly combinations of Pyrethrins and Synergists which have been approved by various federal agencies for use even in food-processing and food-dispensing establishments.

Having the chemicals, it remains to apply them in the most efficient and economical manner. One type of equipment seems ideally fitted for this kind of work—the so-called fog generator, which produces a fog of microscopic droplets. The size of these droplets can be varied, as needed, by appropriate controls on the machine. This thermal aerosol is achieved by introducing a finely atomized spray into a blast of hot, dry air. When an oil-based insecticide is introduced in the proper proportions into hot, dry air it is possible to apply to interiors a film of insect killing insecticide that is not visible to the naked eye. The extremely small particles are virtually flotation droplets and are carried by the induced thermal currents into all cracks and crevices. Despite the fact that a lethal residual is deposited, discouraging new infestation for some time, no objectionable stains or smears are visible even on the finest of fabrics or highly polished surfaces.

The degree of penetration of the ½-micron size droplet used on interior work is truly amazing. Dr. Robert Glasgow, chief entomologist for the State of New York, has reported on a test in which caged insects and a microscope slide were placed behind a baseboard which was nailed back into place. After fogging this interior the insects were found killed and the slide had an excellent deposit of insecticide. This test took place at the former Sampson Naval Station where over 40,000,000 cu. ft. of interiors were fogged. The cost was less than 1/10th of that for fumigating the same volume of space. In another recent test a 15-car train was completely treated in 15 min., or at the rate of one car a minute. Since only a few hours are required for the fog to do its searching and depositing of insecticide it follows that the camp cars, or any other cars, need not be put out of service for disinfestation.

Types of Enginehouse Doors

What are the various types of doors available for enginehouses? What are their relative advantages from the standpoint of serviceability and maintenance?

Accordion Door Is Best

By L. E. Peyser
Architect, Southern Pacific,
San Francisco, Cal.

Formerly, doors for enginehouses did not present any great problem. The most usual being wooden doors in two leaves attached to a structure by means of heavy hinges, usually shop made. More recently, the use of large power, requiring openings of much greater size than in the past, has made the installation of serviceable, easily operated doors a subject for considerable thought.

Wooden doors of the old type will no longer serve, since they are costly to maintain and, on account of the necessary width, tend to sag, making them difficult to operate. Further, care must be taken to secure these doors carefully in both the open and closed positions against wind action.

An alternate to the two-leaf door is a pair of bifolding or accordion doors of wood. However, these are also difficult to maintain. In addition, due to the longer strap hinges and greater weight of the doors, the hinge pins and bolt fastenings to the structure and through the door leaves wear in a relatively short time to such an extent that the door sags sufficiently to drag on the rails. This makes this type of door difficult to operate and also hastens the destruction of the doors by reason of the force necessary to operate them.

A considerable improvement has been made in this same type of bifolding, accordion door by supporting it from above by means of carriages running on tubular, or similar, trolley tracks, and depending on hinges only for securing the doors to the jambs, to connect the two leaves, and to carry only a part of the weight. These hinges preferably should be of such

length as to overlap for the full width of each leaf. A further advantage is the possibility of installing considerable areas of glazed sashes in the panels to provide needed natural light. These doors will not sag since half the weight and the outer door leaf is carried on the overhead track, but there is a tendency for the wood to warp.

Another type door is the rolling door constructed of steel slats and carried on an overhead barrel or shaft partly counterbalanced by coil springs and usually operated by means of gears actuated manually by an endless chain. These doors are long lived and will give good service but are quite slow in operation. They can be equipped with electric power which, while speeding up the operation, increases the cost.

A comparatively late development of still another type is the so-called "overhead" door, consisting of multiple horizontal panels hinged together, sliding upward on a track and counterbalanced by weights or various types of springs. These doors require a multiplicity of hinges and other hardware, leading to expensive maintenance. Further, on account of the width of the openings, they tend to sag when in the open position and the panels must therefore be trussed by means of belly-rods which are quite easily damaged, resulting in making the door inoperative.

It is believed that probably the best door for the purpose is the bifolding accordion door supported on an overhead trolley as hereinbefore described, using tubular-steel door leaves in lieu of wood construction. This type of door will give long, trouble-free service at a very low cost for maintenance which, except for accidental damage, should consist only of occasional painting.

Designs Special Doors

By J. B. Gunnison
Architect, New York Central System, New York

The types of enginehouse doors that I have found to meet all conditions from the standpoint of serviceability and maintenance are: (1) The two-leaf wood swing doors, and (2) the four-fold wood doors. Wood doors are not subject to corrosion, are easy to repair, can be made to fit snugly, and wickets can be readily installed. When the four-fold doors swing out, I have found that it is necessary to protect the overhead track against the elements.

Our enginehouse doors are built to our own design. Because of their size they are built up in plies with heavy frames, stiles and cross rails. A sash is placed in the upper panel of each door. Diagonal steel tension braces are used to prevent sagging. The doors are hung on heavy strap hinges which are bolted through the door and latching posts are provided to hold the doors in an open position when desired.

Grinding Frogs and Switches

What are the various types of grinders for removing the cold-rolled lips on frogs, switch points and stock rails? For which type of work is each best adapted? Why?

Numerous Types Available

By Edward Wise, Jr.
Engineer Maintenance of Way, Louisville & Nashville, Louisville, Ky.

There are numerous types of machines for removing lips from frogs, switch points and stock rails, and nearly all of them are powered by gasoline engines. On some of them the grinding wheels are operated directly from the engine by belts; on others through flexible shafts from the engine to the grinding wheel. Some grinders operate through reciprocating abrasive blocks. A variety of grinding wheels and appliances are used to perform various kinds of grinding, such as welds, stock rails, switch points, frogs, etc.

In my opinion the gasoline-powered flexible-shaft type of grinder is the one best fitted for removing cold-rolled lips from switch points, stock rails and frogs, because of its portability, its low initial cost and low operating expense.

Each Type Has Advantages

By Roadmaster

The cold working of steel under traffic forms lips on the gage side of rail heads, frogs, and crossings, and on the backs of switch points. Unless removed, these lips will, in time, cause trouble in every case except on the heads of rails on tangent track. On manganese crossing frogs, the pressure of wheel flanges breaks off the lips, and more often than not, a whole corner of the frog. On stock rails these overflow lips cause the switch points to chip, aided quite often by a lip on the back of the switch point. These switch point and stock rail troubles can be serious enough to cause derailments.

In view of this lip-forming tendency, the prevention of which has not yet been found to my knowledge, a means of removing the overflow metal must be provided for the sake of economy and safety. No better device has been found for this purpose than the gasoline or electric-driven grinder.

Two general types of grinders are used for this purpose: (1) The flexible-shaft machine; and (2) the on-track precision stock-rail grinder which can also operate a flexible shaft. With the flexible-shaft machine, overflow metal can be removed anywhere it is found. In addition the switch point can be re-dressed to a standard contour in case a chip has already broken out of it. This machine is essentially a utility device, serving many purposes other than those mentioned. As such, it is one of the most beneficial tools the maintenance man has at his disposal.

The stock-rail grinder is a specialty machine, designed to perform precision work. It can remove lips on frogs, crossings and switch points as well as recess stock rails for switch point protection. The addition of a flexible shaft attachment adds to its usefulness. In territories having several interlocking plants or many main track switches, a machine of this type is almost indispensable and can be kept in use continuously. The fact that it is an on-track machine does not affect its use on stock rails and switch points because the switch has to be thrown and adjusted in any case, which actions require the use of the track.

The utility of the flexible-shaft grinder makes its use preferable in yards, where a larger number of damaged switch points often require not merely dressing but complete reshaping. In the hands of a good operator this type of machine will also recess main-track stock rails satisfactorily. However, the time required to perform such work with the flexible-shaft unit exceeds that with the machine specifically designed for that purpose and it should be used for this purpose only when the other is unavailable.

Flame-Hardened Open-Hearth Frogs

What are the advantages of flame-hardening open-hearth frogs? How and where should this work be done? Are special precautions necessary?

Flame-Hardening Practical

By R. W. Torbert

Assistant to Vice President Oxweld Railroad Service Company, Chicago

The flame-hardening of open-hearth frogs is both practical and economical. The present use of flame-hardened frogs indicates that more than three times the service may be expected from them as from untreated frogs before they need to be built up by welding. By controlling the wear on the running surface, impact is kept at a minimum and wear is reduced on other parts of the frog. Reducing impact also increases the service life of switch timbers.

Flame-hardening is usually performed at a central point where facilities are available, and costs less than half as much as one building-up operation. Normally, the areas treated are the point and wing rails from the throat of the frog to the place where the wheels are entirely carried by the point. A tank large enough to accommodate the entire frog is provided and the frog is placed workwise in the tank. The tank is kept filled with water and maintained at a level within ¼ in. of the frog running surface. Suitable oxyacetylene heating heads are mounted on a motor-driven carriage to provide the necessary heat required. When wear occurs after this method of treatment, the frog can be built up by the oxyacetylene process the same as an untreated frog.

Hardening Increases Life

By A. F. Huber

Chief Engineer, American Brake Shoe Company, Ramapo Ajax Division, Chicago

The hardening of the entire top surfaces of open-hearth frogs, and particularly of those portions of the point and wings subjected to the batter and abrasive action of wheels, has proved to be a desirable and economical procedure which greatly increases the life of frogs in track before replacement or welding repairs are necessary. Best results are assured by hardening new rails in the shop where the frog is manufactured.

Our method provides for passing an oxyacetylene flame, at a controlled speed and distance, over the top of the rail heads and on the sides near the frog point. The burner is specially designed to have the proper number and spacing of orifices to insure uniform heating and the absence of burning and oxidation. The heat application is followed immediately with an air quench produced by compressed air nozzles so spaced and directed that a sufficient volume of dry air strikes the heated surface to reduce its temperature below the critical transformation range. About two minutes later, water is sprayed on the rail to prevent any surface softening effect from the heat remaining in the interior of the head. Only first-quality controlled cooled rails are used, and each is treated to insure uniform hardness and penetration, especially in the thin ends of the long and short points.

Elimination of Silica Scale

How serious is the formation of silica scale in boilers? What are its disadvantages? What recent methods have been developed for its control? Explain.

Several New Methods Used

By Ray McBrian

Engineer Standards and Research, Denver & Rio Grande Western, Denver, Colo.

The seriousness of the problem of silica scale formation is becoming more evident with the present tendency toward high pressures in both locomotive and stationary boilers. There is also a problem in the Clarkson-type of heating boiler used on Diesel passenger locomotives, where demineralization of the feed water does not remove all silica. In certain territories, low-hardness waters with relatively low silica content also show a tendency to the formation of a thin deposit of silica which can result in serious overheating. With the coming of the steam turbine as a railroad prime mover, or with its use in the stationary field, all silica scale removal must be accomplished.

A newly developed method of removing all silica along with other dissolved solids consists of a compression still, which is driven by either electric or Diesel power. This process consists essentially of a boiling chamber called an evaporator, a heat exchanger, and a vapor compressor which adds heat to the vapor for producing distilled water that is free of silica.

Another recently developed method of removing silica consists of the rusting of iron in the form of cast iron borings in the presence of the water to be treated.* The hydrous ferric oxide thus formed absorbs the silica by physical action.

Still another new development applies the principles of demineralization to the removal of silica. This system employs standard demineralizing equipment to which is added a unit for removing silica. First, sodium fluoride is added to the raw water and the fluoride is converted to hydrofluoric acid. This combines with the silica to form fluorosilic acid. This acid is then removed by an alkali-regenerated anion exchange unit of high capacity.

Possibly of greater importance are those localized waters low in hardness and silica content. Internal treatment using such materials as sodium phosphate, or aluminates, with organic compounds, will maintain the silica in solution or precipitate adherent scale which must then be removed by blowing or washing. Economies can be realized by utilizing this method of internal treatment to reduce the cost of operating steam locomotives and to increase the period of their availability.

*Described in detail on page 684 of the July, 1947, issue of *Railway Engineering and Maintenance*.

Raises Maintenance Costs

By Engineer of Water Service

The potential damage due to silica scale which is allowed to form in a boiler depends upon the rating, type and pressure of the boiler. The higher the pressure and rating the greater the damage. Locomotive boilers with only light deposits of silica scale show bagged and cracked siphons, blistered and bulged arch flues, leaky staybolts, corrugated side sheets, leaky flues and cracked flue sheets. Damage such as this results in excessive maintenance costs and reduced availability, which can be a sizable sum not easily evaluated. The difficulties are usually more severe in oil-fired locomo-

tives due to the lack of even heat distribution, such as can be accomplished with coal.

Silica scale in water-tube boilers will cause blistered and bulged tubes that will finally rupture. With water-cooled walls and high heat transfer rates through these tubes, it is very important that no silica scale be present, since resultant overheating will cause failure of the tubes. Very frequently it is impossible to find these defects since the tubes may be buried in a tube bank and be curved so that internal inspection cannot reveal the presence of overheating or scale.

The troubles caused by localized overheating and tube failure are further intensified by the presence of small amounts of oil with the silica scale, until the situation becomes serious, mounting rapidly with the increase in boiler pressure above 200 lb. p.s.i. In the interest of safety it is not desirable to invite such troubles into the operation of any steam generating plant. Further, if scale of this character can cause severe overheating of the metal, it is obvious that its insulating value is very high and that excessive fuel losses can be expected.

The formation and deposition of silica scale has been inadvertently encouraged by the reduction of the excess alkalinities in the effluent from limesoda softeners in order to realize, in other ways, better boiler operation. Silica scale likewise results from zeolite-treated waters and waters of natural low hardness. Even careful operation of the zeolite softener allows a small amount of calcium to leak through at the end of the softening run, and with some zeolites there is a definite silica pickup in the softener effluent.

Natural waters or softened water with a silica to calcium ratio of about 1:1 are ideal for the formation of silica scale. If scale is to be avoided, it is desirable to treat the water with phosphate and tannin or other suitable organic material to alter the condition and prevent adherence of the sludge. The carrying of 40 to 80 p.p.m. of excess phosphate (PO_4) in the boiler water precludes the possibility of silica-scale formation since the boiler water is kept stripped of calcium by reason of the insolubility of tri-calcium phosphate. The soluble silica is allowed to build up and the concentration is kept under control by means of the continuous blowdown.

This method, although not the newest, appears to be the most practical in railroad work. Merit is found, however, in the use of ferric salts in cold process, lime-soda plants to reduce the silica. Where stationary plants have hot-process softeners, it is desirable to use magnesium oxide or dolomitic lime for silica reduction, but in most cases these do not eliminate the use of phosphates in the boiler to provide positive action in the prevention of silica scale formation.

The latest process for silica removal involves the use of a demineralizing plant. This process is more expensive than those mentioned above and the control has to be more exact. While by any process, control of silica scale is difficult and expensive, the cost can usually be justified.

Brushing Preservatives on Timber

Where should brushed-on preservatives be used in connection with the construction or repair of treated or untreated timber trestles or other structures? What preservatives are most suitable for these purposes?

Brush on All Cut Surfaces

By T. E. Jackson

General Bridge and Building Supervisor, Southern Pacific, San Francisco, Cal.

Where new trestles or culverts are to be built of treated material, the timber should be framed to the required dimensions before treating. In the construction of the structure the surface of the framed and treated members should not be disturbed unless absolutely necessary. Should the surface of creosoted timber be disturbed in shipping, unloading, or in some other manner, the ruptured area should be covered with an application of hot creosote oil.

The need for this method of application due to alterations in the field, however, is small, as there should be little, if any, necessity to disturb the surface of creosoted material used for stringers, caps, ties, bracing, bulkhead plank and culverts. The required length of this material is known and preframing in advance of the treatment can be so exact as to require no alterations in the field.

On the other hand, treated piles must be cut at the desired elevation for capping. When this is done, three coats of hot creosote oil should be applied on the cutoffs, followed by an application of hot asphalt to seal the cuts from water or fungi. Before the caps are placed, burlap, roofing paper, or metal covers should be placed over the piles to provide additional protection against the weather or fungi, or against mechanical wear.

Where untreated material is used, it is considered good practice to brush on an application of hot creosote oil on the ends of framed posts of bents, on the ends of stringers that are cut to length, and on the bearing areas where the stringers rest on the caps. This treatment protects the material from decay and also makes it resistive to fungi.

There is little need for further treatment of untreated timber, except in cases where it is used in the ground. In such cases, the brush-on application of hot creosote oil may retard decay, but is ineffective in the long run.

Where so-called "clean treatment" preservatives have been used to treat material, the surface of which has been disturbed by cutting or planing, two coats of a prepared concentrated solution of the preservative being used should be brushed on all of the cut surfaces.

Important To Treat Cuts

By W. A. Sweet

General Foreman, Bridges and Buildings, Atchison, Topeka & Santa Fe, Newton, Kans.

It is highly important that a preservative be brushed on all cuts which must be made in the field while constructing trestles or other structures of treated timber. The same applies to all repairs made to structures built of treated timber, regardless of whether new or secondhand treated material is used. Two applications of creosote oil mixed with crude oil applied hot and followed by a sealing coat of hot pitch is the most suitable preservative for this purpose. This same treatment provides protection against decay and discourages termites when used generously around sills and foundations of untreated structures while making repairs to them.

Where treated timber is not used in outside docks or platforms, an application of the treatment described above to the tops of joists, and to the bottoms and ends of deck plank will greatly retard early decay so prevalent in the low-grade unseasoned lumber so commonly fur-

nished by the timber suppliers today.

Decay of piles may become evident where scour has exposed timber that has been below the ground for a number of years. Preservative brushed on such exposed areas will check the decay and prolong the life of the piles.

Use of Various Grout Admixtures

*In roadbed grouting operations, what are the various materials that can be added to the grout to improve its flow and penetrating characteristics? What are their relative advantages?**

Several Types Are In Use

By J. P. Datesman
Division Engineer, Chicago & North Western, Green Bay, Wis.

Beginning with the practice of the stabilization of water-pocketed roadbeds by the pressure grouting process, there has been a tendency to shift to the use of admixtures. The use of such materials has been encouraged with the object of securing a more efficient grout mixture, i. e., one that is cohesive and at the same time flowable, so that it will circulate satisfactorily into various types of ballast material in the subgrade.

The type of ballast encountered in water pockets has a very important influence on the type of grout that will be accepted. Stone ballast generally has large voids, and it has been noted from test-hole studies that the ballast in water pockets is generally very clean due to the fact that the water present in most cases washes the ballast particles free of dirt and silt. Gravel, cinders, and other similar types of ballast, of course, have smaller voids, and the acceptance of grout in such ballast is much slower than in the type with larger voids.

The use of various materials to improve the flow-ability and cohesiveness of grout are, in some cases, also made necessary by the type of sand employed in grouting operations. The ideal sand consists of wind-blown, rounded particles mixed with from one to three per cent of dirt or silt. When course-particle sand or sand that is free of silt or dirt is used, a fine material of some kind should be added to increase the flow-ability and reduce the tendency for the cement and water to separate from the sand particles.

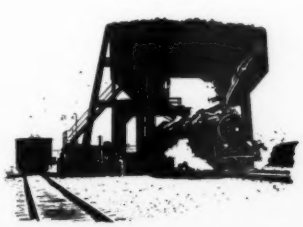
There are three, and possibly more, types of admixtures in use, but those most generally used are emulsified asphalt, air-entraining agents, and fly-ash. In most cases, each of these admixtures performs a specific function which the others do not, and still all three produce similar results in that they provide a cohesive mix which decreases the tendency for the grout to separate, and at the same time increases its flow-ability and penetrating qualities.

Emulsified asphalt serves as a binder and also has a tendency to waterproof the grout and, if used in sufficient quantities, will provide a certain amount of flexibility. The cost of this material is very small and has practically no effect on the cost of the finished grout in place, as the major cost involved is for labor.

It has been found from practical experience that it is necessary at times, when grouting into fine-particle ballast, to increase the amount of emulsified asphalt which, in turn, increases the cohesiveness and flow-ability of the grout.

Fly ash has been used extensively by some railroads, as it is finer than cement, takes the place of silt or dirt in sand which contains none, and also increases the cohesiveness and flow-ability. Its cost, like that of emulsified asphalt, amounts to practically nothing as compared to the total cost of the grout application. Its use is especially desirable when course-particle sands are used or when an especially clean sand is encountered. Experience has brought out the fact that even a wind-blown, rounded-particle sand that is entirely free of silt has a tendency to separate from the cement and water, unless a certain amount of silt or dirt is added, and the fly ash seems to fill this requirement.

Air-entraining cement, or cement to which an air-entraining agent has been added, has been recommended by manufacturers and used by many railroads in grouting operations on the basis that increased flow-ability would be secured as well as additional cohesiveness, even though the strength of the grout might be weakened somewhat by the amount of air entrained in the cement. But even though the grout is weakened, such weakness would have no direct bearing on the results obtained in most instances, as the strength of grout very rarely enters into the effective results to be obtained from grouting operations.



All of the three products mentioned are especially adapted to lean grouting mixes as they more or less take the place of cement in providing flow-ability of the grout. Personally, I have never been an advocate of the use of lean mixes, as experience has demonstrated that the savings resulting from such mixes are more than offset by the increased labor cost in injecting them, as considerable time is lost with lean mixes owing to hoses and points becoming clogged due to the separation of the ingredients.

It has been found that mixes varying from one part of cement to six parts of sand, to one part of cement to eight parts of sand, are the easiest to inject under ordinary conditions where the strength of grout has no direct bearing on the results to be obtained. Of course, where slides or unstable soil conditions are encountered, richer mixes should be used as the strength of the grout has a direct bearing on the results.

Considering the results obtained from the three types of admixtures listed, it would appear that they should be used in all grout mixes either singly or together, depending on the type of sand used. Regardless of the mix used, the type of injection equipment has a direct bearing on the type and amount of admixtures to use. It has been found that air injection equipment is more apt to separate the water and cement from the sand than hydraulic equipment, although either type of equipment will produce successful results with proper grout.

There are differences of opinion, of course, as to the types of equipment to be used for pressure grouting work, i.e., whether air-injection or hydraulic injection is the more successful. Opinions also differ as to the amount and types of admixtures to be used. It appears, however, that each method of grout injection and each type of admixture has its advantages. Since grouting is, we might say, in its infancy, experimental practices will continue to be carried on covering not only types of grouting equipment but grout mixes as well. But in spite of such experiments, the amount of grout accepted in water pockets will always be governed by the type of ballast contained in them.

*Additional answers to this question will be published in a subsequent issue.

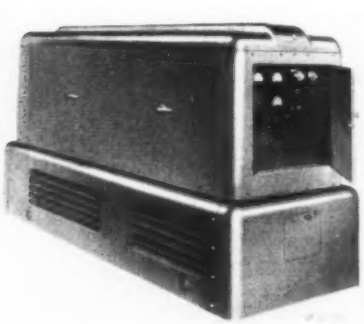
PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 539)

Diesel-Electric Plants

A NEW line of Diesel-electric plants, designed to provide low cost electric power under continuous operating conditions on either mobile or stationary jobs, has been announced by D. W. Onan & Sons, Inc., Minneapolis, Minn. Two general types of these plants are available, one type being operated by a water-cooled Diesel engine, and the other powered by an air-cooled Diesel engine.



The Onan water-cooled Diesel-electric plant

The Onan water-cooled Diesel-electric plant is enclosed in a weatherproof, sheet-steel housing with removable side panels for easy servicing, and has a welded base of heavy structural steel. It has a heavy-duty "Lanova" full Diesel engine with large capacity copper-and-brass radiator, and a six-blade, belt-driven pusher fan. A welded steel battery-and-accessory rack contains two six-volt starting batteries, which are kept fully charged by a 12-volt generator.

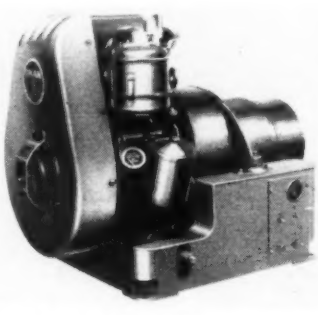
The plant has an Onan saturated-field generator which is said to have good voltage regulation without the use of rheostats or other external electrical equipment. If extremely close regulation is needed, however, automatic voltage regulators can be supplied.

The engine instrument panel is built-in, as is the electric instrument panel, eliminating the need for a separate switchboard, and the panels are illuminated by a 12-volt pilot light. All alternating-current models have a running-time meter.

Either 50 or 60-cycle alternating current models of the water-cooled Diesel-electric plant are available in capacities ranging from 10,000 to 35,000 watts, with voltages ranging from 115 to 380. Direct-current models of the water-cooled plant can be supplied in units of 10,000 and 15,000-watt capacities and with voltages of 115 and 230.

The Onan air-cooled Diesel-electric plant is said to be unusually compact and light in weight. The application of air-cooling to the Diesel is claimed by the manufacturer to simplify servicing and to reduce maintenance costs.

The Diesel engine in this plant is a one-cylinder, four-cycle unit. Electric cranking of the engine is made possible by a specially-designed automatic compression release. Starting controls are located at the plant, and additional starting controls can be installed at stations within 250 ft. of the unit. This plant also has the Onan saturated-field generator. All engine and generator controls required for operating the plant are located on the base.



The Onan air-cooled Diesel-electric plant

The plant has a built-in fuel tank. The air-cooled Diesel-electric plants are available in either alternating or direct-current models of 2,500-watt capacities, with voltages ranging from 115 to 230.

Rotary Hand Pumps

The Industrial Pump Division, Bowser, Inc., Fort Wayne, Ind., has recently added several new units to the Bowser line of rotary hand pumps. Among these is the No. 3003, a 10-g.p.m., crank-operated barrel pump equipped with a drip pan which is cast with the bung attachment. The drip pan, 7½ in. in diameter, has fins to support oil cans or other containers and is fitted with a brass screen to exclude foreign matter from the overflow which can run back into the barrel from the drip pan.

Another new unit is the No. 3008 which, in addition to the drip pan feature, has a meter mounted between the pump and the spigot. The meter measures the quantity pumped.

Still another of the new rotary pumps is a refueling unit, the No. 3005, complete with a meter which records the number of gallons dispensed. This unit is said to be adaptable for use with a skid tank in refueling field equipment. It consists of a 10-g.p.m., crank-operated pump, a bung attachment for either 1½-in. or 2-in. openings, a ¾-in. by 40-in. suction pipe, a discharge pipe with a

The Bowser No. 3003—barrel pump with drip pan

hose hanger and 8 ft. of ⅝-in. hose.

One other unit, the No. 3007, has a pump and meter similar to the No. 3008, but the drip pan feature is eliminated.

All-Purpose Tool Kit

THE Ingersoll-Rand Company, New York, has announced a new all-purpose tool kit which features the new Ingersoll-Rand electric-impact tool. With standard equipment the new tool kit contains the impact tool with a Jacobs collet-type chuck, six hexagonal sockets of various sizes, a Morse Taper socket, and an adapter sleeve. A completely outfitted kit contains, in addition to the standard equipment, many other accessories, including twist drills, reamers, taps, carbide-tipped masonry drills, hole saws, screw and stud extractors, wood bits and wire brushes, all in sizes specified.

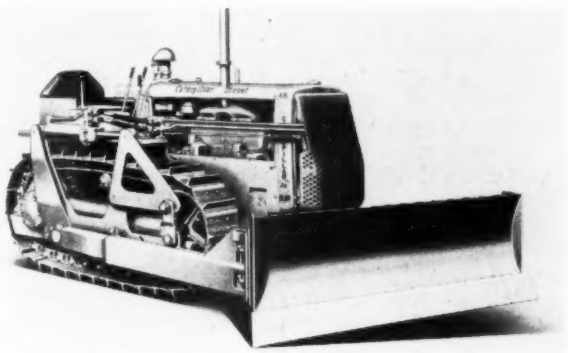
Using the impact tool with the accessories, many maintenance and construction operations can be accomplished, such as the drilling of steel, masonry, and wood; the application and removal of nuts and bolts; the driving and removal of screws; hole sawing, tapping, reaming and wire brushing; the application and removal of studs; and the extraction of broken cap screws and studs.

The basic unit is a motor-driven tool employing an impact mechanism which delivers 1,900 rotary impacts per minute. It is available with either a 110-volt or a 220-volt motor and can be operated with either alternating or direct current. It is said that when the tool is in operation, there is no kick or twist to the hand of the operator and that the motor continues to run even when the spindle is stalled.

A completely outfitted Ingersoll-Rand all-purpose tool kit

Angle Bulldozers for Caterpillar Tractor

THE Caterpillar Tractor Company, Peoria, Ill., is now producing the Caterpillar No. 4A angling type, hydraulically-controlled bulldozer which is designed for exclusive use with the Caterpillar D4 Diesel track-type tractor. The unit supplements the No. 4S, straight-type bulldozer and gives increased earth-moving characteristics to the D4 tractor by providing either type of bulldozer blade for use in earth-handling operations.



Caterpillar 4A Angling-Type Hydraulically - Controlled Bulldozer Mounted on a Caterpillar D4 Track-Type Tractor

The new bulldozer may be obtained with an 88-in. blade for use with the 44-in. gage D4 tractor or with a 108-in. blade for the 60-in. gage tractor. The maximum blade-pitch adjustment is 25 deg. and the maximum tilting adjustment is 6 in. Control of the unit is through a closed-type hydraulic system with the movement being directly controlled by a manually-operated control valve with "raise," "lower" and "hold" positions.

The tool is reported as well suited to the earth-moving tasks on relative small jobs, and to the "cleaning up" chores on larger projects. Other tasks for which it is applicable include snow removal, culvert work, refuse handling and a wide variety of other types of off-track maintenance chores.

Utility Derrick

THE Kershaw Company, Inc., Montgomery, Ala., has announced a new hand-operated derrick, called the Kershaw Utility Derrick, which was developed primarily for use by small rail gangs in removing from the track, equipment used in rail-relaying work. Using this derrick, it is said that rail-relaying equipment can be removed from the track at a rate of one piece per minute. It is also adapted for use by small bridge gangs in handling ties, stringers and other bridge timbers.

Using the Kershaw Utility Derrick to Remove a Spike Puller from the Track

The frame of the derrick is constructed of welded steel tubing and is mounted on double-flange steel rollers. The mast and boom, pin connected, are also made of welded steel tubing. Mounted on the boom is a geared hand hoist with safety lock. Positive-type, hand-operated rail clamps are used to

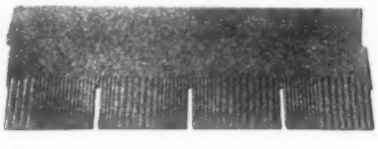
(For additional information regarding any of the products described on this page, use post cards, page 539)

fix the derrick to the rail when lifting.

The derrick, having a capacity of 2,000 lb., can be operated by two men. Since it weighs less than 300 lb., it is said that it can be easily removed from the track by the two operators.

New Asphalt Shingle

THE Lehon Company, Chicago, has introduced a new, heavy-duty addition to its line of Mule-Hide asphalt shingles. The new shingle, a four-unit



The new Town and Country asphalt shingle

strip known as the Town and Country, is said to incorporate new features designed to reduce maintenance and replacement costs by offering increased roof protection and wind resistance.

The new shingle has been designed to provide triple thickness at all exposed tabs. To give greater wind resistance the weather exposure has been shortened to 3⅞ in., thereby decreasing the exposed area and, it is said, permitting more effective nailing, since the nails can be placed closer to the butt of the shingle.

The Town and Country, available in four different colors, weighs 290 lb. per square, the heaviest Mule-Hide strip shingle manufactured. It has the tapered feature of thick-butt shingles and incorporates the Cor-Du-Roy construction.

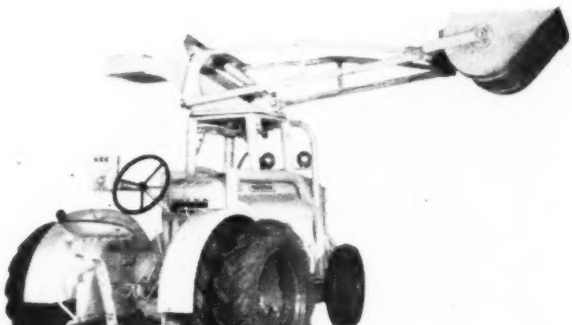
Automatic Flow Switch

THE National Aluminate Corporation, Chicago, is now offering a device known as the Nalco Type M flow switch, for the automatic starting and stopping of chemical pumps and mixers. When installed in a raw-water line, the flow switch starts chemical pumps and mixer motors as the water begins to flow through the line, and turns such equipment off when the flow ceases.

The Nalco Type M flow switch

The switch contains a flexible bronze paddle which is inserted into the raw-water line at right angles to the direction of flow. Fastened to the upper end of the paddle is a stainless steel armature plate. Magnetic attraction of the switch mechanism to the armature plate causes the circuit to remain open until it is closed by the action of the paddle when it is actuated by the flow of water in the line. The entire switch mechanism is sealed and is completely water tight.

The body construction of the switch is entirely of bronze to avoid interference with the magnetic mechanism. A tension arrangement permits adjustment of the paddle for operation in lines of various flow rates. The paddle is furnished in a length sufficient to operate in 14-in. pipe lines and may be trimmed off to suit smaller pipe sizes.



A LeRoi 105 Tractair, with the new loader, showing the swing of the boom

Swing Loader for LeRoi Tractair

THE LeRoi Company, Milwaukee, Wis., has announced that the LeRoi 105 Tractair, a wheel-type tractor combining a 105-cu. ft. compressor, can now be equipped with a hydraulically-operated, heavy-duty industrial-type loader having a load capacity of 1,200 lb. and a swing-type boom which can be swung through a range of 180 deg. Designed especially for the Tractair, the initial installation of the loader attachment can be done, it is said, in about four hours in the case of a Tractair in the field. Subsequent removals or reinstallations, however, are said to require approximately one hour. The attachment, it is claimed, in no way interferes with the operation of the Tractair.

When the loader is mounted in position and ready for operation, loading is accomplished with the bucket in the forward position. Dumping of the load is possible in any position within the swinging range. Complete control of all operations of the loader is achieved through a selector valve control box. The bucket automatically returns to the loading position after being tripped for load release. The hydraulically-operated lift and swing system is designed with an overload relief valve which eliminates loading beyond the capacity of the loader. A booster ram applies forward pressure during the initial loading period when power is most needed. This ram acts also as a cushion when the bucket returns to the load position.

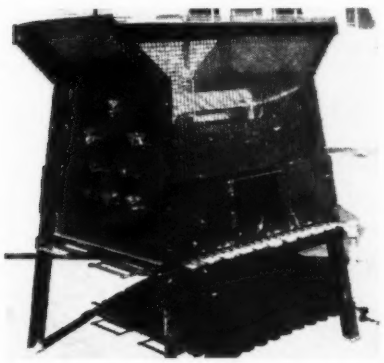
The weight of the loader attachment is centrally distributed on the Tractair frame, a feature said to eliminate excessive loads on the front or rear wheels. To achieve maximum traction under all conditions, dual rear wheels and wheel weights are recommended. The loader frame is of extra-heavy welded steel tubing and has a rugged radiator guard.

Small Steam Sand Dryer

A SMALL steam sand-drying unit for furnishing dry sand at locations where a large capacity is not required has been developed by the Ross & White Co., Chicago. It consists essentially of an open-top, box-like structure lined with steam coils on the sides and bottom, and supported on four legs. Two of the sides are enclosed by open wire netting to permit quick escape of vaporized moisture. The wet sand is placed in the unit through the open top. As the sand dries by the heat of the steam pipes it passes out through the openings

(For additional information regarding any of the products described on this page, use post cards, page 539)

between the bottom steam pipe coils onto the floor or into a receptacle. The unit is equipped with movable grates at the bottom to prevent any gravel from falling through with the sand.



The Ross & White small capacity steam sand-drying unit

To clean out the accumulated gravel, the grates can be moved to provide a larger opening.

Using this unit an automatic sand-drying operation can be accomplished. If it is placed under an opening in an overhead green-sand storage bin, arrangement can be made to have the wet sand run into the top of the dryer, passing through it into a receptacle from which the dry sand can be forced by air pressure into the sand plant. Wet sand, of course, can also be shoveled by hand into the dryer. It is said that the unit has a drying capacity of approximately six tons in 24 hrs.

Powder-Actuated Tools

TWO improved models of a powder-actuated tool which employs the power of an exploding powder charge to drive a "holding stud" into steel, masonry or concrete, have been introduced into the railroad field by the Tempo Products Company, Cleveland, Ohio. One of these models is known as the Tempotool "22", while the other, designed for jobs beyond the capacity of the "22", is known as the Tempotool "38".

The Tempotool "38"

Using these tools, sheet steel can be directly fastened by drive pins to other steel or to concrete. Also, threaded studs may be driven into steel or concrete to act as anchors for objects which may be attached to them. It is said that the "22" stud when imbedded by this tool in sound concrete will withstand a direct pull of more than 500 lb., with the holding power in steel being much greater. Time savings achieved by the use of these tools on all kinds of fastening jobs are claimed to exceed 50 per cent, since no drilling or hammering is required.

Basically, each of these tools is a cylindrical device containing a rifle-like barrel and a firing mechanism to explode a powder charge which is inserted into a breech plug on the barrel. The drive pin or stud, acting as a projectile, is shot from the barrel by the explosion with sufficient velocity to imbed itself firmly in concrete.

The Tempotool "22" is fired by a sharp rap on its back end. A stud fired by this model is said to penetrate mild steel up to a thickness of ⅛ in. The Tempotool "38" will cause penetration of mild steel up to a thickness of ⅝ in., and is fired by a steady forward push rather than by a sharp rap.

New Lifting Magnet

A LIFTING magnet, featuring a new type of welded construction, has been developed by the Ohio Electric Manufacturing Company, Cleveland, Ohio. In this magnet the weld joining the outer ring and the top plate is located on the top of the magnet in a position where, it is claimed, it cannot be cracked or damaged by the force of repeated blows against the outer ring. By eliminating the danger of cracks in the weld, the hermetic seal of the magnet against moisture is said to be indefinitely prolonged.

The new magnet is equipped with chain pins that fit into chain ears with square holes, a feature reported to eliminate friction and prolong life. It has an insulated shell made of iron, bayonet joints for hand operation, and shielded contacts to eliminate danger from arcs. It is available in three sizes. One of these, with a 39-in. diameter, weighs 2,800 lb.; another, with four coils and a 55-in. diameter, weighs 6,800 lb.; and the third, with four coils and a 65-in. diameter, weighs 10,200 lb. Each of the latter two sizes is also available with either six or eight coils if greater lifting strength is desired.

A new 55-in. Ohio lifting magnet with the weld on the top plate

Universal Track Jack

A NEW Simplex track jack for railroad work, a three-purpose model designated as the No. 15A, has been announced by Templeton, Kenly & Co., Chicago. While retaining the outstanding features of its predecessor, the Type A, the new jack embodies a number of improvements as a result of which three track maintenance operations — tamping, surfacing and lining—can all be accomplished with the one jack.

The new Simplex No. 15A universal track jack

One of the new features is a larger bearing area of the toe lift, 2½ in. by 3¼ in., a size which is said to permit lifting at the end of a tie without damage to the tie from cutting. By lifting at the ends of ties, it is said to be possible to tamp throughout a complete rail panel without interference. The large toe lift is also said to help in setting the jack squarely under the load.

Among the features retained from the Type A jack are: (1) A panel and socket design said to cut maintenance by 81 per cent; (2) a short fulcrum center which is claimed to ease lifting effort by 31 per cent; (3) a safety thumb guard for protection of the operator; and (4) a large striking surface which is said to increase the life of the equipment.

(For additional information regarding any of the products described on this page, use post cards, page 539)

THE MONTH'S NEWS

Happenings among railway men— the associations—the suppliers

Changes in Railway Personnel

General

Hugh J. Phillips, engineer maintenance of way of the New York, Ontario & Western, has been promoted to general manager, with headquarters as before at Middletown, N. Y.

Walter O. Frame, superintendent of the Fort Worth & Denver City (part of the Burlington Lines) at Wichita Falls, Tex., and an engineer by training and experience, has been appointed general manager at Fort Worth, Tex.

James M. Aydelott, trainmaster on the Fort Worth & Denver City (part of the Burlington Lines), with headquarters at Amarillo, Tex., and an engineer by training and experience, has been promoted to superintendent.

B. S. Sines, executive representative of the Southern Pacific, with headquarters at San Francisco, Cal., and an engineer by training and experience, has been elected vice-president of the Southern Pacific of Mexico, with headquarters at Guadalajara, Jalisco, Mexico. A sketch of Mr. Sines' career appeared in the March issue.

L. A. Evans, division engineer on the Pennsylvania, at Philadelphia, Pa., has been promoted to superintendent, with headquarters at Indianapolis, Ind. **E. E. Kinzel,** division engineer at Logansport, Ind., has been made tax agent at Philadelphia. **H. C. Kohout,** track supervisor on the Chicago Terminal division, has been promoted to night assistant trainmaster, with headquarters as before at Chicago.

Engineering

W. G. Dyer, engineer of track on the Canadian Pacific, with headquarters at Montreal, Que., has been promoted to district engineer, with headquarters at Vancouver, B. C.

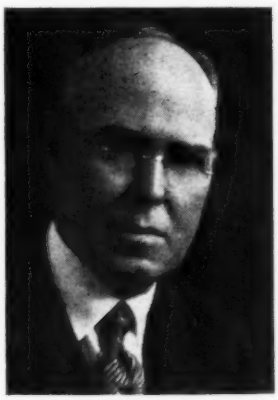
Howard C. Wertenberger has been appointed engineer maintenance of way of the Detroit & Toledo Shore Line, with headquarters at Monroe, Mich., to succeed **O. H. Sessions,** who has retired after completing 41 years of service with the railroad.

Tom A. Blair, assistant chief engineer of the Atchison, Topeka & Santa Fe System, with headquarters at Chicago, has been promoted to chief engineer of the system, with the same headquarters, succeeding **Guy W. Harris,** who has retired after 50 years of service with the railroad.

Mr. Blair was born on June 1, 1892, at DeBeque, Colo., and attended grade and high schools at Grand Junction, Colo., and Montrose. He was graduated from the University of Colorado with a degree in civil engineering in 1913, and two years later he entered the service of the Santa Fe as a rodman at Pueblo, Colo. He subsequently held positions as transitman, office engineer, building inspector, roadmaster, assistant engineer, division engineer, district engineer and trainmaster. In 1938 Mr. Blair was appointed chief engineer, Western Lines, with headquarters at Amarillo, Tex., and was advanced to assistant chief engineer of the system, at Chicago, in 1943.

Tom A. Blair

Mr. Harris was born on March 7, 1878, at Neosho Falls, Kan., and began his career with the Santa Fe Pacific (now A. T. & S. F.) in 1898, as a rodman, subsequently serving as chainman, transitman and assistant engineer at various points on the road. In 1906 he became assistant engineer in charge of construction work of the Pecos & Northern Texas and the Southern Kansas of Texas, at Amarillo, Tex., advancing to chief engineer of the P. & N. T. in 1909. Mr. Harris was appointed chief engineer of the Santa Fe's Coast Lines, at Los Angeles, Cal., in 1912, which post he held until 1918, when he became corporate chief engineer of the railroad during federal control, with headquarters at Chicago. He was appointed assistant chief engineer of the Santa Fe system in 1920, and chief engineer in 1928.

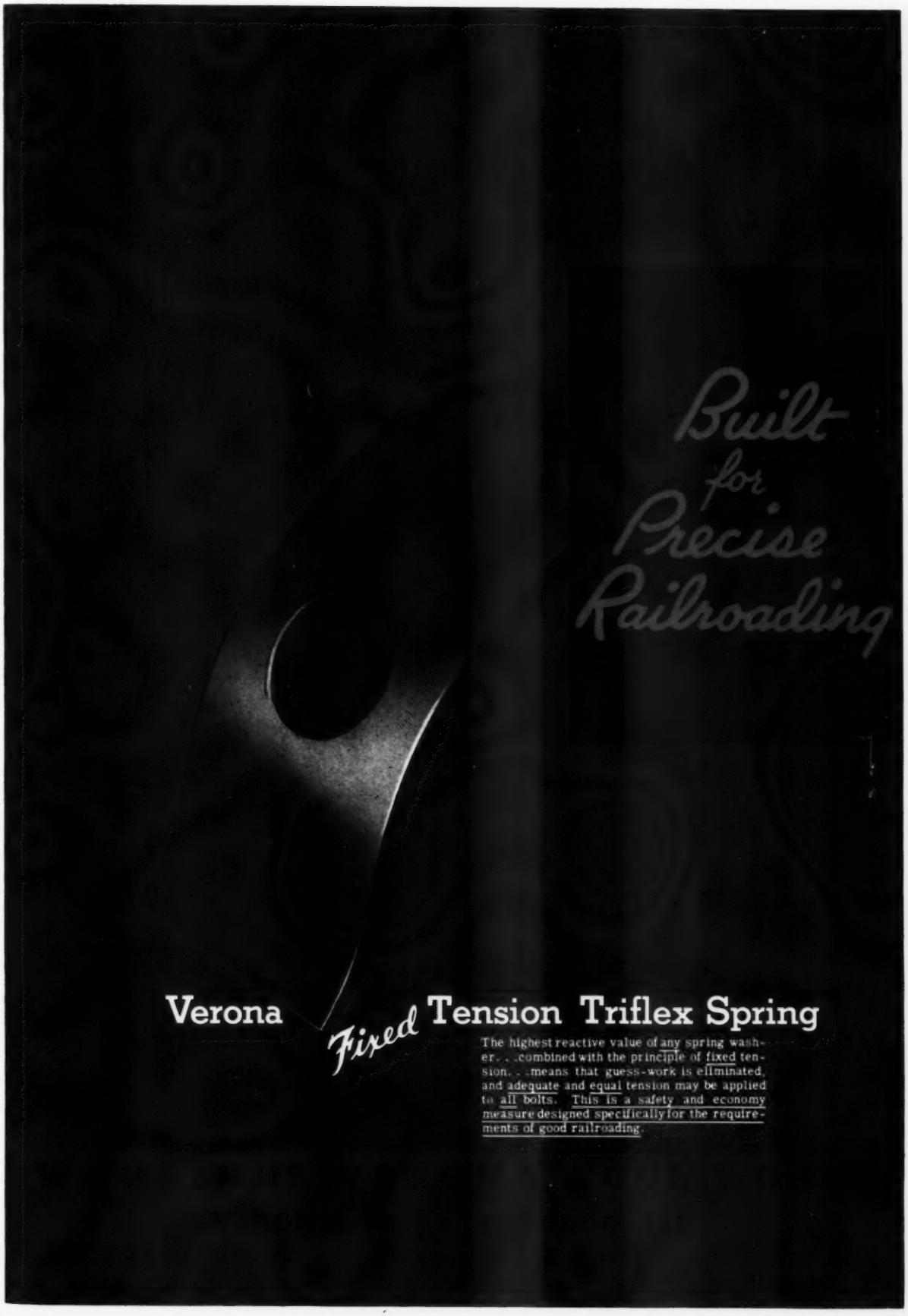


Guy W. Harris

E. Osland, assistant engineer on the Atchison, Topeka & Santa Fe, with headquarters at Chicago, has been appointed office engineer in the office of the chief engineer system, at Chicago, to succeed **F. S. Hewes,** whose death was reported in the April issue.

John E. Armstrong, whose appointment as assistant district engineer of the Canadian Pacific at North Bay, Ont., was noted in the April issue, was born at Cleveland, Ohio, on December 26, 1909, and was graduated from McGill university in 1933 with a degree in civil engineering. He entered the service of the Canadian Pacific in 1928, serving during summer vacations as a chainman and rodman. In 1934 he went with the Crawley & McCracken Company as camp inspector at various points in Ontario, and in 1936 was appointed assistant metallurgist for the Holcomb Steel Division of the Crucible Steel Company of America at Syracuse, N. Y. Mr. Armstrong returned to the Canadian Pacific in 1938 as assistant engineer at Toronto, Ont., and in 1940 was promoted to division engineer at that point. He was holding this position at Sudbury, Ont., at the time of his recent promotion.

(*Continued on page* 524)


Built for Precise Railroading
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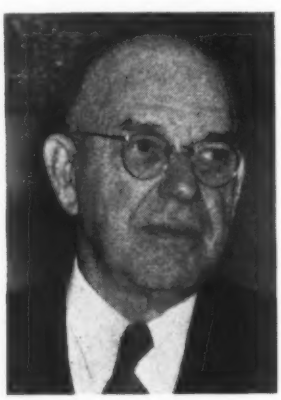
The highest reactive value of any spring washer . . . combined with the principle of fixed tension . . . means that guess-work is eliminated, and adequate and equal tension may be applied to all bolts. This is a safety and economy measure designed specifically for the requirements of good railroading.

Railway Personnel (Cont'd)

J. J. Clutz, division engineer on special duty, office of chief engineer, system, of the Pennsylvania, has been appointed assistant to chief engineer on the Eastern region, with headquarters at Philadelphia, Pa., and **C. L. Towle,** supervisor of track on the Panhandle division, Denison, Ohio, has been promoted to assistant division engineer, special duty, office of chief engineer, system.

J. C. Warren, supervisor on the Pennsylvania at Trenton, N. J., has been promoted to assistant division engineer, with headquarters at Altoona, Pa., to succeed **G. M. Smith,** who has been appointed engineer maintenance of way and structures of the Washington Terminal at Washington, D. C., in place of **G. Baylor.** Mr. Baylor has been appointed division engineer on the Pennsylvania at Philadelphia, Pa., replacing **L. A. Evans,** whose appointment as superintendent is noted elsewhere in these columns. **J. W. Buford,** assistant division engineer on the Philadelphia division, has been promoted to division engineer at Logansport, Ind., succeeding **E. E. Kinzel,** whose appointment as tax agent at Philadelphia is also reported elsewhere in these columns. **W. N. Myers,** supervisor at Huntingdon, Pa., has been advanced to assistant division engineer on the Philadelphia division to succeed Mr. Buford.

F. L. Guy, whose retirement as engineer maintenance of way and structures of the Southern Pacific, Pacific Lines, at



F. L. Guy

San Francisco, Cal., was reported in the April issue, was born at Gallipolis, Ohio, on March 16, 1883, and received his higher education at the University of Kansas. He began his railroad career with the Atchison, Topeka & Santa Fe in 1901 as a chainman, and subsequently served on various western railroads as axeman, rodman, trainsitman, assistant engineer and locating engineer. In 1914 he became resident engineer of the El Paso & Southwestern (now part of the S. P.), and in 1924 he was appointed division engineer of the S. P. at San Francisco. He was promoted to engineer maintenance of way and structures in February, 1938, which position he held until his retirement.

S. McIlwain, assistant engineer of the Canadian National, with headquarters at Allandale, Ont., has been promoted to division engineer of the Allandale division, succeeding **W. E. Mellor,** transferred. **E. T. Gove,** assistant to engineer maintenance of way at Toronto, has been appointed assistant district engineer of the Northern Ontario district at North Bay, Ont.

M. W. Clark, principal assistant engineer of the Atlantic Coast Line, has been appointed assistant chief engineer, with headquarters as before at Wilmington, N. C. **W. L. Hartzog, Jr.,** assistant engineer bridges, has been appointed principal assistant engineer, with headquarters as before at Wilmington. **R. I. Simkins** has been appointed assistant to engineer of bridges, at Wilmington.

Mr. Clark was born at Savannah, Ga., on April 5, 1908, and was graduated from Citadel, Charleston, S. C., with the degree of bachelor of science in civil engineering. He entered the service of the At-

M. W. Clark

lantic Coast Line as a chainman in the valuation department at Wilmington on June 15, 1930. He was appointed rodman at Jacksonville, Fla., the following September, becoming junior draftsman at Wilmington three months later. On September 1, 1935, he became senior draftsman and on February 1, 1936, he was made assistant supervisor building repairs at Rocky Mount, N. C. Mr. Clark was appointed junior engineer at Wilmington on February 1, 1937, and 14 months later he became assistant engineer at Savannah, Ga. On February 1, 1939, he was appointed office engineer at Savannah, becoming supervisor building repairs there on October 16, 1944. Five months later Mr. Clark went to Wilmington as office engineer, and in April, 1947, he was appointed principal assistant engineer, which position he held until his recent appointment as assistant chief engineer.

Howard M. Shepard, whose appointment as assistant to chief engineer of the Erie, at Cleveland, Ohio, was noted in the April issue, was born on March 28, 1894, at Nutley, N.J., and received his higher education at Newark Technical college. He entered the service of the Erie in October, 1912, as a rodman at Disko, Ind., and subsequently held the positions of inspector, locating engineer and assistant chief draftsman at various points until April, 1941, when he was appointed chief draftsman at Cleveland. From April, 1942, to November, 1946, he served as lieutenant colonel with the U.S. Army Transportation Corps in the Southwest Pacific, and on his return to the Erie on the latter date he was appointed assistant engineer at Cleveland, which position he held until his recent promotion.

A. A. Johnson, whose appointment as assistant chief engineer on the Delaware, Lackawanna & Western, with headquarters at Hoboken, N. J., was noted in the

A. A. Johnson

April issue, was born at Mansfield, Pa., and was graduated with a degree in civil engineering from Lafayette college in 1907. In October of that year he entered railroad service with the New York Central, holding various positions on the engineering corps until 1910 when he was made assistant supervisor of track, in which capacity he served at Hudson, N. Y., and Pawling. From 1916 to 1920 he served as assistant engineer, and in the latter year was promoted to supervisor of track at Kingston, N. Y. In 1926 Mr. Johnson went with the D. L. & W. as engineer of track, with headquarters at Hoboken, and in 1934 was appointed engineer maintenance of way, which position he was holding at the time of his recent promotion.

Herbert G. Dennis, whose appointment as district maintenance engineer of the Chicago, Rock Island & Pacific, with headquarters at Kansas City, Mo., was reported in the April issue, was born at Savanna, Ill., on May 23, 1900. He entered the service of the Rock Island in 1924, serving in the engineering department at various locations until 1929. He served as roadmaster and track supervisor on the Des Moines division. From 1934 to 1938 Mr. Dennis held the positions of master carpenter and division engineer, being promoted to district bridge engineer in the latter year, with headquarters at El Reno, Okla. In 1942 he was commissioned a lieutenant-colonel, serving in the Military Railway Service until 1946, when he returned to the Rock Island as division engineer at Des Moines, Iowa.

(*Continued on page* 526)

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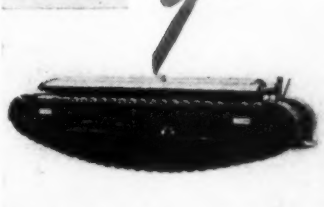
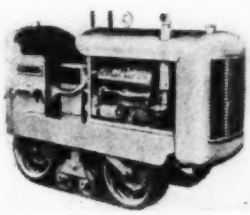
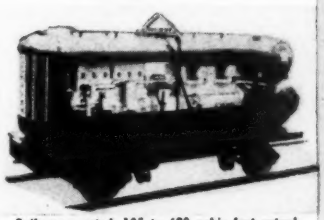


Off-track crawler, gasoline or Diesel
Operates up to 24 tampers.

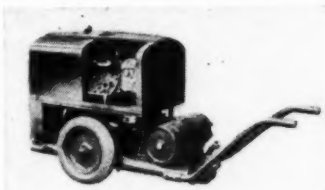


Model 60 Crawler for 4 tampers.

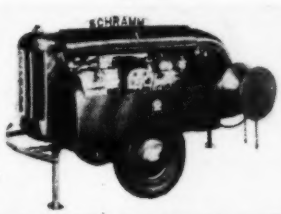
Model 60 self-propelled rail car.



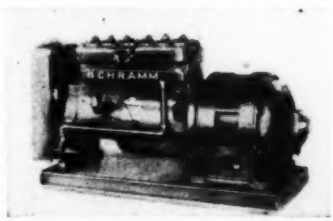
Railcar mounted, 105 to 420 cubic feet actual air capacity.



Model 60 Tampair for 4 tampers.



Two-wheel trailer, 60 to 105 cubic feet actual air capacity.



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Railway Personnel (Cont'd)

John P. Hiltz, Jr., whose appointment as engineer maintenance of way of the Delaware, Lackawanna & Western at Hoboken, N. J., was noted in the April issue, was born at Baltimore, Md., on September 8, 1911. He attended Baltimore Polytechnic Institute and Carnegie Institute of Technology, receiving his B.S. in C.E. degree from the latter in

John P. Hiltz, Jr.

1934. He entered railroad service with the Pennsylvania on June 15, 1934, as an assistant on the engineer corps and subsequently served that road as assistant in the office of the comptroller and in the real estate department, as assistant supervisor of track and supervisor of track of the Long Island at Jamaica, N. Y. In March, 1945, Mr. Hiltz went with the Lackawanna as engineer of track at Scranton, Pa., and was holding this position at the time of his recent promotion.

Track

R. S. Roller has been appointed assistant supervisor of track on the Chesapeake & Ohio, at Columbus, Ohio.

E. A. White, roadmaster on the Chicago & North Western, with headquarters at Sterling, Ill., has been transferred to Chicago to succeed **D. V. O'Connell,** who has retired.

Changes on the Pennsylvania

V. F. Grubaugh, assistant supervisor on the Pittsburgh division of the Pennsylvania, has been promoted to supervisor at Logansport, Ind., succeeding **J. V. Adams,** who has been transferred to Trenton, N. J., to replace **E. Wollett, Jr.,** who in turn relieves **J. T. Evans** at Cincinnati, Ohio. Mr. Evans has been made supervisor at Trenton, to succeed **J. C. Warren,** whose promotion to assistant division engineer is noted under Engineering.

W. B. Knight, assistant supervisor on the Philadelphia division, has been promoted to track supervisor at Shire Oaks, Pa., to succeed **P. J. Harnish,** who has been transferred to Chicago to relieve **H. C. Kohout,** whose appointment as night assistant trainmaster is noted elsewhere in these columns. **R. L. Romberger,** junior engineer on the Middle division, has been promoted to assistant supervisor on the Pennsylvania division to succeed **H. O. Stratton,** who has been transferred to the Philadelphia division to replace Mr. Knight. **N. P. Patterson,** supervisor at Dunkirk, N. Y., has been transferred to Huntingdon, Pa., to relieve **W. N. Myers,** whose promotion to assistant division engineer is noted elsewhere in these columns. **W. E. McColgin,** assistant supervisor at Alliance, Ohio, has been promoted to supervisor at Dunkirk, in place of Mr. Patterson.

W. E. Hiltebeitel, assistant supervisor of track on the Philadelphia division, at Enola, Pa., has been transferred to the Eastern division, with headquarters at Alliance, succeeding Mr. McColgin, and **L. D. Freeman, Jr.,** junior engineer, Eastern region, has been appointed assistant supervisor of track on the Philadelphia division, at Enola, to succeed Mr. Hiltebeitel.

H. W. Manning, supervisor of track on the Philadelphia division, has been transferred to the Panhandle division, with headquarters at Denison, Ohio, to succeed **C. L. Towle,** whose promotion to assistant division engineer is reported elsewhere in these columns. **N. L. Hoachlander,** assistant supervisor of track on the Philadelphia division, Harrisburg, Pa., has been promoted to supervisor of track, with headquarters at Enola, to succeed Mr. Manning, and **J. G. Wilson,** assistant supervisor of track, New York division, at Jamesburg, N.J., has been transferred to the Philadelphia division, succeeding Mr. Hoachlander. **W. S. Titlow, Jr.,** junior engineer on the Eastern region, has been promoted to assistant supervisor of track on the New York division, to replace Mr. Wilson, with headquarters at Jamesburg. **Anthony Cipiti,** general foreman of track on the E. & A. division, at Niles, Ohio, has been promoted to assistant supervisor of track on the Pittsburgh division, with headquarters at Johnstown, Pa., to succeed Mr. Grubaugh.

Bridge and Building

James D. Moore, Jr., whose promotion to master carpenter on the Pennsylvania, with headquarters at Toledo, Ohio, was noted in the April issue, was born on October 12, 1917, and was graduated from the Drexel Institute of Technology with a bachelor of science degree in civil engineering in 1940. He entered the service of the Pennsylvania on February 1, 1941, as a bridge and building apprentice, serving in that capacity at various locations until February, 1945, when he was promoted to assistant master carpenter on the Philadelphia Terminal division. In Feberuary, 1947, he was appointed acting master carpenter on the Wilkes-Barre division, returning to the Philadelphia Terminal division as assistant master carpenter in May of that year, and was holding this position at the time of his recent promotion.

C. E. Helmle, whose appointment as bridge and building supervisor on the Southern Pacific at Houston, Tex., was noted in the March issue, was born at Dallas, Tex., on April 13, 1904, and received his higher education at Rice Institute. He entered railroad service in 1926 as instrumentman on the Texas & New Orleans (part of the S. P.), at Houston, and advanced through various positions to senior instrumentman. From 1932 to 1939, Mr. Helmle was engaged in seismograph work, returning to the S. P. in the latter year as instrumentman at Victoria, Tex. He subsequently held the position of estimator-draftsman, office engineer, assistant engineer, assistant bridge and building supervisor and acting roadmaster, and was holding the position of assistant bridge and building supervisor at the time of his recent promotion.

Special

John Schofield, whose retirement as chief architect of the Canadian National System, at Montreal, Que., was reported in the April issue, has been associated with planning and building projects in the transportation field for more than 40 years. During the war he served as construction controller in the Department of Munitions and Supply at Ottawa, Ont., and undertook special duties for the Department of Transport, the British Ministry of Aircraft Production and the Royal Air Force Ferry Command. Mr. Schofield planned and directed the construction of buildings for the Pacific communications system in the northwest, and defense communications in eastern Canada. He was consultant on decoration of the train used during the visit of the royal family to Canada and the United States in 1939. On the formation of

John Schofield

Trans-Canada Air Lines in 1937, he was also named architect for that organization. Mr. Schofield had charge of the architectural work in the Montreal Terminal development, including the International Aviation building, for which a contract was awarded recently.

J. A. Denton, assistant chief tie and timber inspector on the Chicago & Eastern Illinois, has been promoted to chief tie and timber inspector, with headquarters at Mt. Vernon, Ill., succeeding **J. M. Wilkinson,** who has retired.

(*Continued on page* 528)

A CLEAR TRACK FOR THE IRON HORSE

Lorain TL-20 plays important maintenance role for Chicago, Milwaukee & St. Paul R. R.

Shovels help trains keep on schedule. This TL-20, working near Eatonville, Wash., is one of two Lorains serving the Chicago, Milwaukee & St. Paul R. R. in this division. With the coming of spring, the threat of mud and rock slides increases here. It's the TL-20's job to keep all such potential slide material removed from areas adjoining the tracks.

More and more Lorain TL-20's are entering railroad service. Modern design of turntable, featuring unit assembly, makes for high efficiency power transmission, greater simplicity and ease of maintenance. All units feature complete interchangeability of boom equipment and are available with either 2-speed chain drive crawler or 9 types of rubber-tire mountings.

There's nothing in the ½ yd. class that matches the new Lorain TL-20 for power, speed, dependability and ease of maintenance. You can get the complete story from your local Thew-Lorain distributor. Write or call him now.

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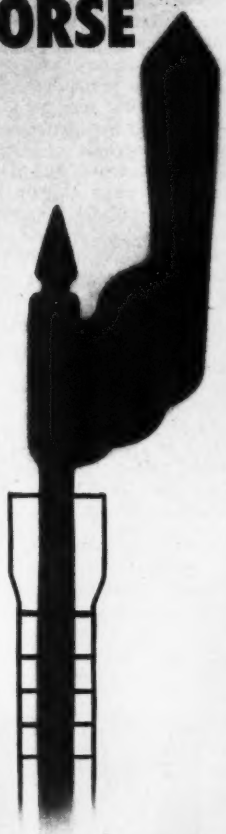

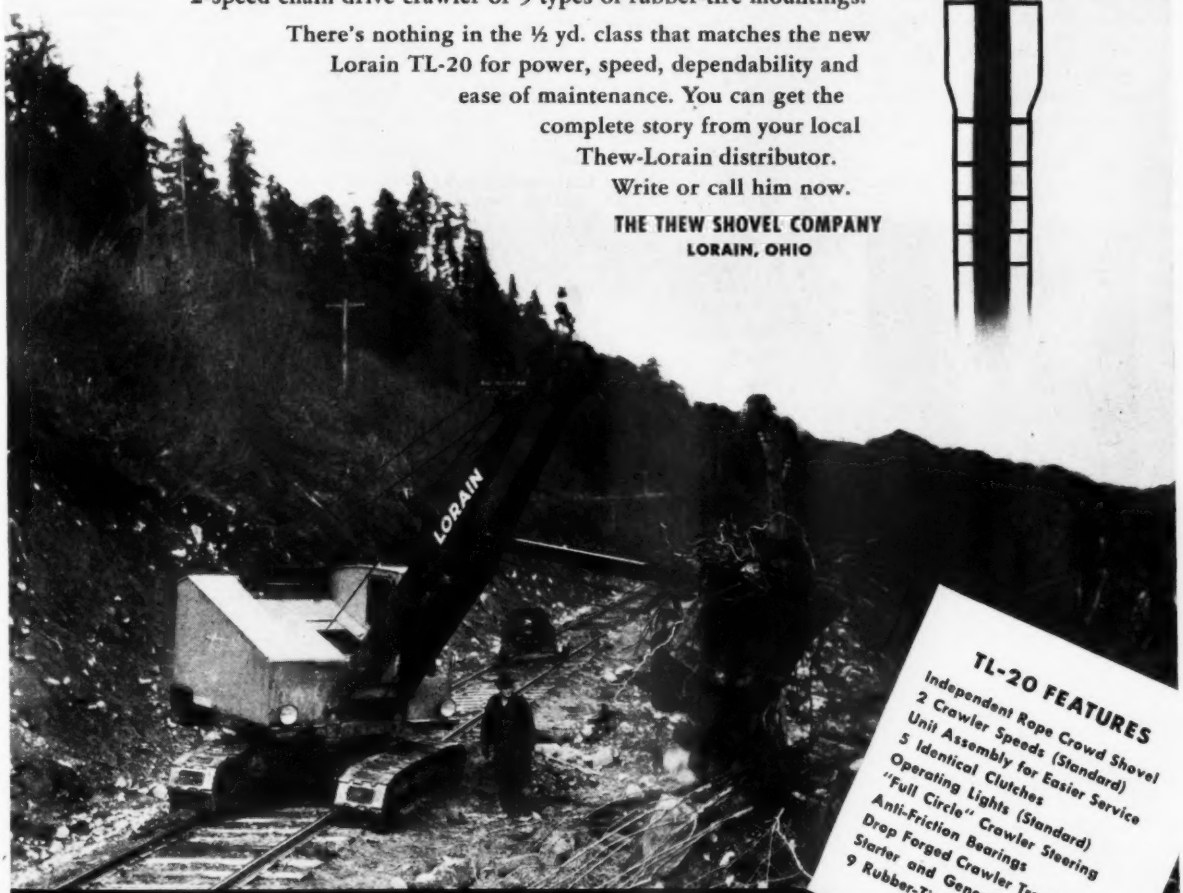

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Railway Personnel (Cont'd)

Walter Roy Gibbons, whose retirement as real estate and tax agent of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, Ohio, was reported in the April issue, was born in Indianapolis, Ind., on January 30, 1879, and received his higher education at the Rose Polytechnic Institute at Terre Haute, Ind., being awarded a degree in civil engineering in 1901. His first employment was with a bridge engineering firm at Kansas City, Mo., and in 1905 he entered the service of the Big Four in its construction department at Mattoon, Ill. He became chief draftsman in the office of the chief engineer at Cincinnati in 1907, and two years later was appointed engineer for the land and tax department. He was appointed assistant real estate agent in 1910 and real estate agent in 1913. Mr. Gibbons was further advanced in 1917 to real estate and tax agent, the position he held at the time of his retirement.

Obituary

Fred L. Thompson, retired vice-president in charge of engineering of the Illinois Central, whose death was reported in the April issue, was born on February 1, 1872, at Grandview, Ill., and was graduated from the University of Illinois in 1896 with a bachelor of science degree in civil engineering. He entered the service of the I. C. in June of that year, serving successively as axeman, chainman and rodman, and later held positions as resident engineer, assistant engineer, acting roadmaster and roadmaster. In 1907 he was advanced to assistant engineer of bridges and buildings, being further advanced to engineer of bridges and buildings in 1910, and to engineer of construction in 1913. Mr. Thompson's next post was that of assistant chief engineer, which position he held from 1914 to 1918, when he became chief engineer. On February 1, 1925, he was elected vice-president in charge of engineering, and served in that capacity until his retirement in 1942. For two years during World War II, Mr. Thompson was associated with the Office of Defense Transportation.

Fred L. Thompson

Association News

Maintenance of Way Club of Chicago

Details of the annual meeting of the club, scheduled to be held on April 26, are not available as this issue goes to press. A report on this meeting, therefore, which was planned as "Old Timer's Night," together with the names of those elected as officers for the ensuing year, will appear in the June issue.

Bridge & Building Association

The Executive committee of the association will meet in Chicago on June 28 to review preliminary drafts of the eight technical committee reports now under way. It is hoped that all committee chairmen will be in attendance at this meeting in order to present their reports in person, and have the benefit of suggestions on the part of the Executive committee.

Roadmasters' Association

President A. B. Chaney has called a meeting of the Executive committee in Chicago on July 12, with the primary purpose of reviewing the six technical reports now being prepared by association committees. A special invitation will be sent to all committee chairmen to attend this meeting in order that they might present the reports in person and have the benefit of any suggestions made by the Executive committee.

Wood-Preservers' Association

Early closing of this issue of *Maintenance* makes it impossible to report here upon the annual meeting of the association, scheduled to be held in St. Paul, Minn., April 27-29. A highlight report of this meeting will appear in the June issue, with appropriate coverage of any reports or addresses that are of interest to maintenance officers.

Metropolitan Maintenance of Way Club

The annual meeting of the club, with election of officers, was scheduled to be held on April 29 in the Skyline room of the Hotel Sheraton, New York, beginning with dinner at 6:30 p.m., to be followed by an address by E. T. Moore, chief executive officer, Central Railroad of New Jersey, on "Taking Some of the Guesswork Out of Maintenance." Details of this meeting, which are not available as this issue goes to press, will appear in the June issue.

Track Supply Association

A meeting of the Board of Directors of the association was held in Chicago on April 13 to transact routine business and make preliminary plans for the joint exhibit of the association in September with the Bridge and Building Supply Men's Association, in conjunction with the annual meetings of the Roadmasters', and Bridge and Building associations. Early in May, Secretary Lewis Thomas of the association will send out applications for space reservation at the exhibit.

American Railway Engineering Association

Initial action has been taken during the past month looking to the formulation of plans for commemorating the association's semi-centennial year which will culminate with the next annual convention. President Mottier has appointed a steering committee to exercise general supervision over the development of these plans, and announcment is to be made shortly of the appointment of other committees to handle various phases of the undertaking, all with a view to the conduct of an annual meeting next year that will be distinctive in many respects. On April 20 the chairmen of standing committees met with President Mottier at Chicago and, in addition to a discussion of the regular work of the committees, considerable time was devoted to the subject of committee participation in the activities of the association during the semi-centennial year.

No standing committees held meetings during April but five of them have scheduled meetings to be held during May. These are as follows: Masonry, at Washington, D.C., on May 3-4; Water Service and Sanitation, at Atlantic City, N.J., on May 5; Iron and Steel Structures, at Washington, on May 5-6; Yards and Terminals, at Cleveland, Ohio, on May 11; and Records and Accounts, at St. Louis, Mo., on May 25-26. In addition the Committee on Rail has tentatively scheduled a meeting to be held at Chicago on May 26.

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 20-22, 1948, Hotel Stevens, Chicago. Elise LaChance, secretary, 431 S. Dearborn street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 15-17, 1949, Chicago. W. S. Lacher, secretary, 59 E. Van Buren street, Chicago 5.

American Wood-Preservers' Association—H. L. Dawson, secretary-treasurer, 1429 Eye street, N.W., Washington 5, D. C.

Bridge and Building Supply Men's Association—Joint exhibit with Track Supply Association, September 20-22, 1948, Hotel Stevens, Chicago, during concurrent conventions of American Railway Bridge and Building Association and Roadmasters' Association. E. C. Gunther, secretary, 122 S. Michigan avenue, Chicago 3.

Maintenance of Way Club of Chicago—Next meeting, October 25, 1948. Headquarters 105 W. Adams street, Chicago 3.

Metropolitan Maintenance of Way Club—John S. Vreeland, secretary, 30 Church street, New York.

Railway Tie Association—Annual meeting, August 30-September 1, 1948, Greenbriar Hotel, White Sulphur Springs, W. Va. Roy M. Edmonds, secretary-treasurer, 610 Shell Building, St. Louis 3, Mo.

National Railway Appliances Association—R. B. Fisher, secretary, 1 No. LaSalle street, Chicago 4.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 20-22, 1948, Hotel Stevens, Chicago. Elise LaChance, secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Joint exhibit with Bridge and Building Supply Men's Association, September 20-22, 1948, Hotel Stevens, Chicago, during concurrent conventions of Roadmasters' Association and American Railway Bridge and Building Association. Lewis Thomas, secretary, 59 E. Van Buren street, Chicago 5.

"THIS FORMULATION SOUNDS O K—DOC"

"Make up 5 gallons — take it to Oklahoma — let me have a report on results shown when inspection is made every ten days for the next three months"

SUCH conversation is typical of what goes on in the offices and laboratories of READE MANUFACTURING COMPANY *daily* as railroads bring to us their weed control problems.

Perhaps such careful, scientific study of the problems of weed control is unusual, for few companies have the talent and experience to study them with the necessary degree of intelligence.

If we have maintained our lead as we seek to do, it is because we have plowed back our earnings into expanded plant capacity, into research, and in retaining over the full calendar year, chemists who know the subject of the chemistry of weeds intimately—also in retaining men who have practical experience in the railroad field.

READE MANUFACTURING COMPANY owns completely equipped spray cars. They move on a schedule from one job to another without any lost time or motion, completing the spraying of extensive mileage with a speed that astonishes roads unfamiliar with such improved equipment.

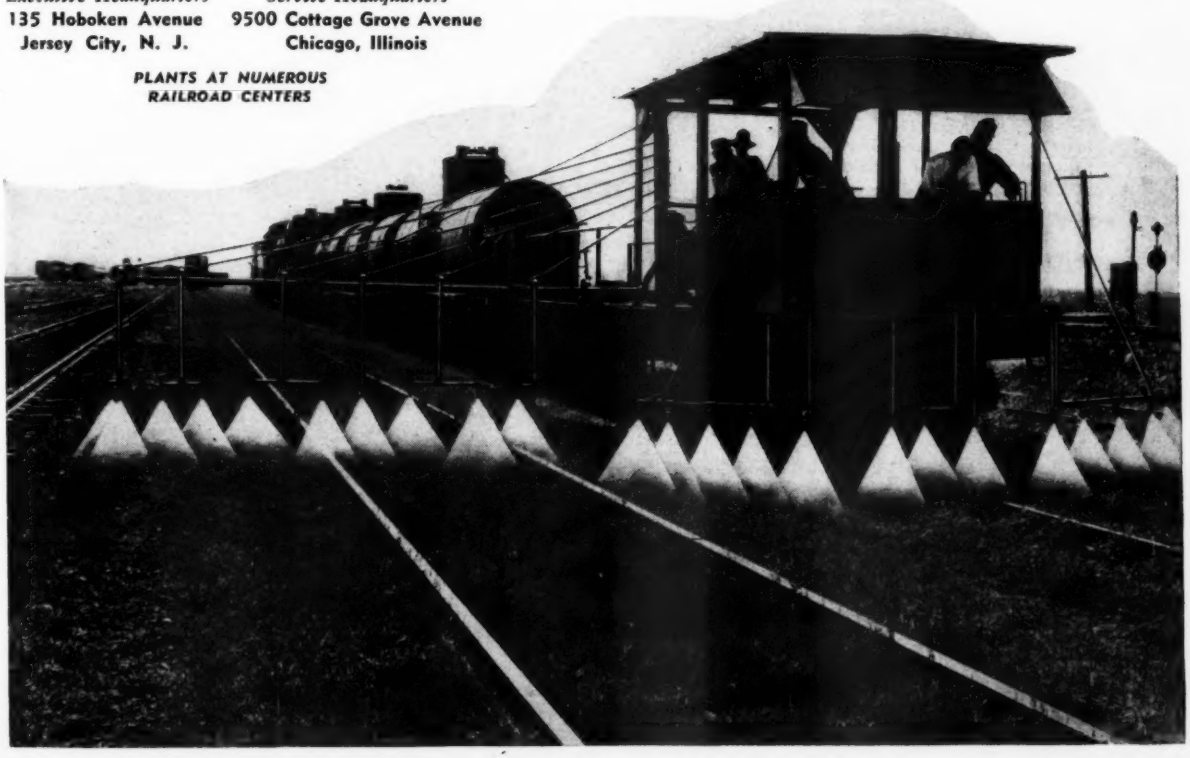
MAY WE HAVE THE OPPORTUNITY OF STUDYING YOUR WEED CONTROL PROGRAM?

READE MANUFACTURING COMPANY

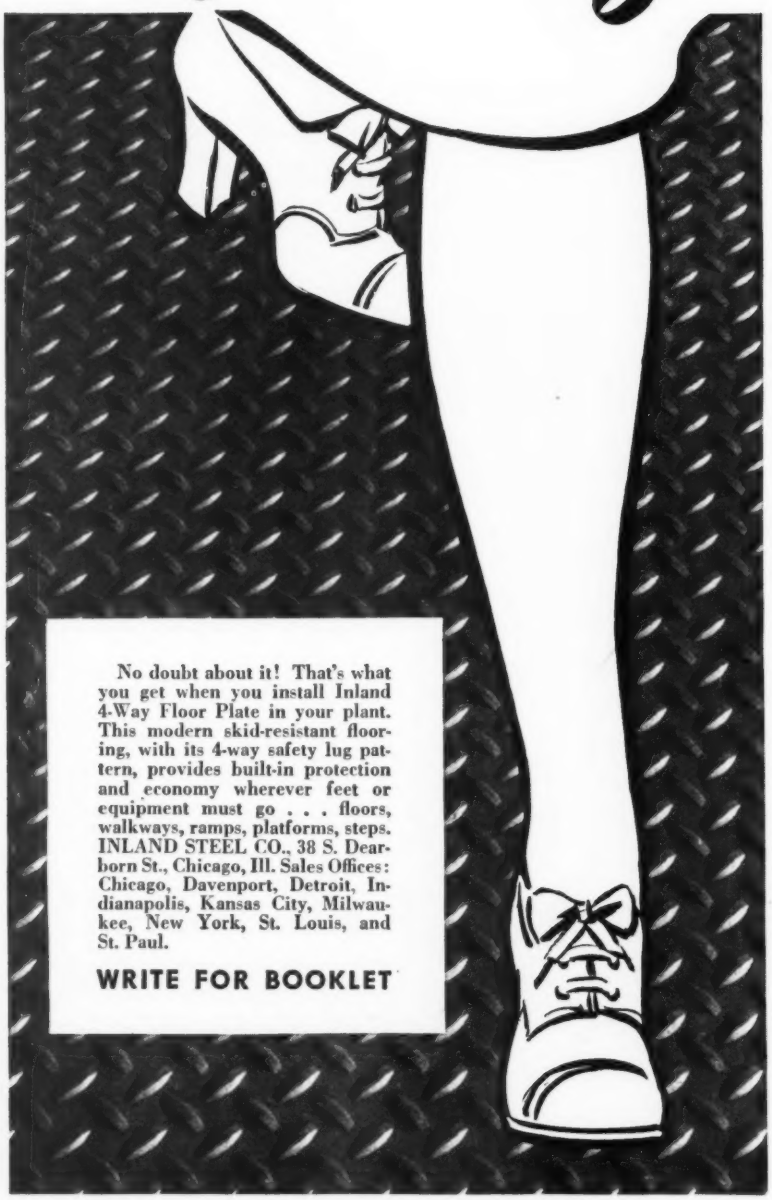
Executive Headquarters
135 Hoboken Avenue
Jersey City, N. J.

Service Headquarters
9500 Cottage Grove Avenue
Chicago, Illinois

PLANTS AT NUMEROUS RAILROAD CENTERS



Safe Footing



No doubt about it! That's what you get when you install Inland 4-Way Floor Plate in your plant. This modern skid-resistant flooring, with its 4-way safety lug pattern, provides built-in protection and economy wherever feet or equipment must go . . . floors, walkways, ramps, platforms, steps. INLAND STEEL CO., 38 S. Dearborn St., Chicago, Ill. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, and St. Paul.

WRITE FOR BOOKLET

INLAND

Stocked by Leading Steel Warehouses

4-WAY FLOOR PLATE

Supply Trade News

General

The Link-Belt Company has announced the opening of a sales office at Louisville, Ky. **Emmart LaCrosse, Jr.,** district sales engineer at Indianapolis, Ind., has been appointed district sales manager in charge of the new office.

At the annual meeting of stockholders on April 15 the name of the **American Rolling Mill Company** was officially changed to **Armco Steel Corporation.** This change does not affect the subsidiary, **Armco Drainage & Metal Products, Inc.**

The Reynolds Metals Company, Louisville, Ky., has announced the appointment of two new distributors of its aluminum mill products: The **Hamilton Steel Company,** 12875 Taft road, Cleveland, Ohio, and the **Arthur C. Harvey Company,** Harvey Steel road, Allston district, Boston, Mass.

Personal

The Air Reduction Sales Company has announced a number of personnel changes, brought about by the merger of its apparatus sales department and the arc-welding sales department. **Dale D. Spoor,** manager of the dealer sales department at New York, has been appointed manager of the equipment sales department; **Ira B. Yates,** manager of the arc-welding sales department, has been made manager of arc-welding and supplies sales, and **J. F. Carroll,** assistant to the apparatus sales manager, has been named manager of apparatus sales.

Mr. Spoor was graduated from the Massachusetts Institute of Technology

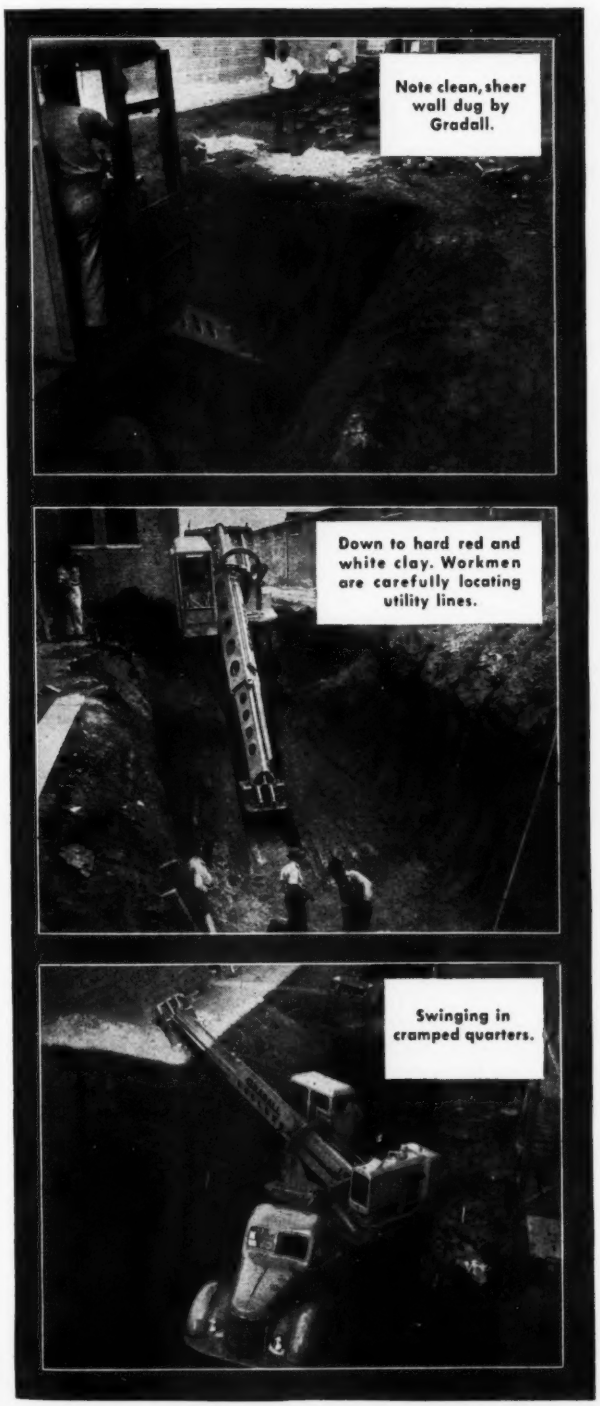
Dale D. Spoor

with a B.S. degree in engineering administration, and in 1928 went with the Western Oxygen Company, Sacramento, Cal. In 1929, when this company was acquired by Air Reduction, Mr. Spoor was transferred to the applied engineering department in New York. He subsequently served as technical supervisor at

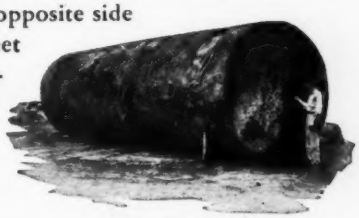
(*Continued on page* 532)

Digging a hole...
may not be as simple as it seems

On the surface it looked easy—digging a hole in the ground.
. . . But this particular operation presented complications.


Note clean, sheer wall dug by Gradall.
Down to hard red and white clay. Workmen are carefully locating utility lines.
Swinging in cramped quarters.

THE project involved an excavation 50′ x 15′ x 15½′ to contain a 25,000 gallon cooling tank. But one side of the excavation was within 12 feet of a building. The opposite side was within 30 feet of another building and only 15 inches from an 18-inch sewer line 8 feet deep.


This is the 25,000 gallon cooling tank to be buried.

There was a busy crosswalk at one end with utility lines under it and at the extreme end there was an 8-inch sewer line hard on the edge of the pit.

A first cut 5½ feet deep was dug—with an approach ramp. The miscellaneous lines regulated the depth of the ramp but Gradall backed right in and tackled the job.

Digging to 8 feet was comparatively easy. Then extremely hard red and white clay was encountered.

Gradall did the entire job in 22 hours, moving an estimated 450 cubic yards—180 yards of which were loaded away by truck.

Not once was Gradall halted by the obstructions—not once did Gradall damage a line or building. Instead, Gradall worked with precision and dispatch—digging clean, sheer walls without waste motion, *and without need for other machines or hand labor.*

Contractors everywhere are learning Gradall does *more* jobs *better* and at *lower cost.* It will pay you to investigate Gradall.

GRADALL
DIVISION
WARNER & SWASEY
Cleveland

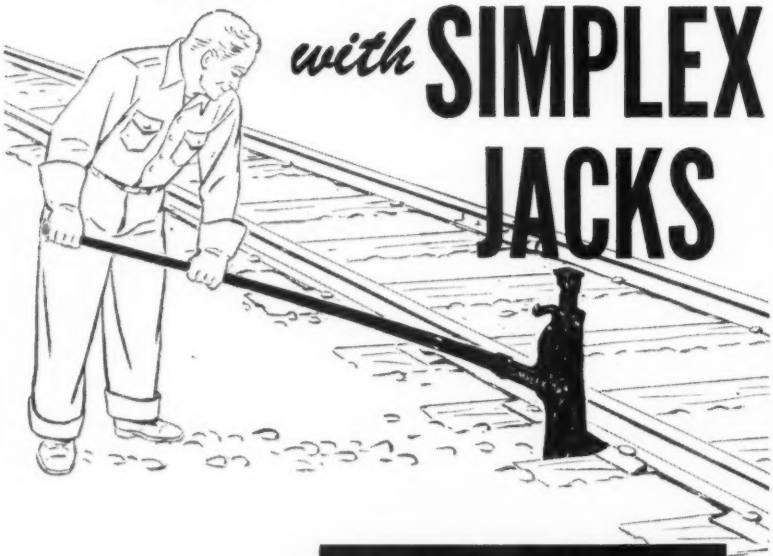
Get all the facts about Gradall. Write Warner & Swasey, Cleveland 3, Ohio.
See the Gradall at Booth 3821, Chicago Road Show

The Warner & Swasey Co.,
Cleveland 3, Ohio
Please send more information about the Gradall Multi-Purpose Machine.

*Name*_____
*Address*_____
*City*_____ *Zone*____ *State*_____
N-548

Gradall Reg. U. S. Pat. Off.

You Take Full Advantage of THE LOW COST OF LIFTING with SIMPLEX JACKS



SAVE TIME . . . SAVE WORK ON EVERY MAINTENANCE JOB

Virtually every Maintenance-of-Way job requires moving or shifting of heavy equipment and material. Top jacking efficiency on the job helps you get more work done, easier and faster . . . lets you achieve important time, money and manpower savings.

With Simplex Jacks and other maintenance equipment these are savings you can depend on—day after day—to help you reduce overall maintenance costs. Efficiency is built right into every Simplex Jack, along with the durability, ease of operation and safety that have made Simplex by far the preferred Jack in the railroad field.

Simplex Single and Double Acting Track Jacks
Lift full Capacity on Cap or Toe; Short fulcrum center for easier lifting; safety thumbguard, larger striking surface. Seven Models — all 15 Ton Capacity.

Simplex Bridge Jacks
Mechanism is at the top of the Jack; broad toe lift has minimum height of 4⅜".

Simplex Journal Jacks
High capacity; easy lifting; light in weight; easy to operate.

Simplex G-Y Tie Spacer
Saves ties from being sledged; reduces man-hours in straightening ties.

Simplex Rail Pullers and Expanders
Enable one man to replace rail pounding crew.

Simplex Track Shifter
Solves High Speed Main line track shifting problems. Used in sets of two with Simplex Track Jacks.

Simplex
LEVER · SCREW · HYDRAULIC
Jacks

TEMPLETON, KENLY & COMPANY
1026 South Central Avenue, Chicago 44, Illinois

Supply Trade News (Cont'd)

Philadelphia, Pa., and as a salesman at Washington, D.C. In 1941 he was appointed manager of the St. Louis district, and in 1944 returned to New York as manager of dealer sales.

The Link-Belt Company has established a district sales office in Jacksonville, Fla., with **Robert L. Lowder,** formerly district sales engineer at the firm's plant in Atlanta, Ga., as manager.

Earl J. Goris has been appointed advertising manager of the **Dearborn Chemical Company,** at Chicago. Mr. Goris is a graduate of Northwestern University's School of Commerce, and was formerly in the advertising department of the General Electric X-Ray Cor-

Earl J. Goris

poration, at Chicago. Earlier in his career, he was associated with the Chicago advertising firm of Aubrey, Moore & Wallace, the Honolulu Advertiser in Hawaii, and the Wade Advertising Agency in Chicago.

William D. Nesbeitt has been appointed manager of the Spokane (Wash.) district office of the **Allis-Chalmers Manufacturing Company,** to succeed **A. R. Kohlmetz,** who remains in the Spokane office as special representative.

John R. Queen, formerly Texrope sales representative for the **Allis-Chalmers Manufacturing Company** in the New York district office, has been appointed dealer supervisor at New York.

L. W. Stolte, secretary of **Fairbanks, Morse & Co.,** and **Frederick J. Heaslip,** director of purchases, both with headquarters at Chicago, have been elected directors of the firm. They succeed **A. E. Ashcroft** and **F. C. Dierks,** retired.

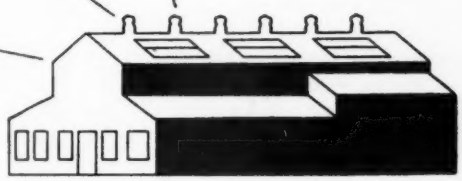
George R. Frankland, assistant district manager of the Industrial Products division of **Johns-Manville Corporation,** at Chicago, has been promoted to district manager, with the same headquarters, succeeding **Corydon H. Hall,** who has resigned. **William S. Hough,** manager of the Chemical and Aviation sections of the company's Special Industries department at New York, succeeds Mr. Frankland.

(*Continued on page* 534)

1. Construction delays are retarding industrial expansion

2. Construction costs are taking bigger capital outlays

3. Process changes are making "heavy" building obsolete



3 Big Reasons for the Growing Popularity of Plastipitch* Protected Metal.

1. *Speeds up Building.* With roofing and siding of Koppers Plastipitch Protected Metal, permanent, durable industrial buildings can be erected faster.

2. *Keeps Down Costs.* The protective coatings of Koppers Plastipitch Protected Metal Sheets make interior and exterior painting and recoating unnecessary for a long period of years, which means lower maintenance costs.

Koppers Plastipitch Protected Metal Roofing and Siding are not affected by most chemical fumes or salt air spray and are particularly resistant to all types of weather.

3. *Makes Alterations Easier.* Because of the constant change of production methods it is often advisable to alter industrial buildings. This can easily be accomplished by the use of Koppers Plastipitch Roofing and Siding.

30 pounds of tough, flexible Koppers Plastipitch Coatings per square protect the steel sheets from rust or corrosion . . . have an insulating effect which cuts down condensation. Where the sheets lap, the Plastipitch Coatings tend to adhere to each other and make a tight, weatherproof seal which prevents leaks.

These sheets are available flat, corrugated or V-crimped. Field cuts can be made and protected with Koppers Touch-up Compound. All straps, flashings, gutters, downspouts can be provided with the same Plastipitch protective coatings.

Send for the engineering manual on Plastipitch.

This cut-away view shows the protective coatings that prevent corrosion of Plastipitch sheets and make painting unnecessary for long periods of years.

*Reg. Trade Mark, U.S. Pat. Off.

KOPPERS COMPANY, INC.
PITTSBURGH 19, PA.

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KOPPERS COMPANY, INC.
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PITTSBURGH 19, PA.

☐ Please send me free booklet on Plastipitch Protected Metal.

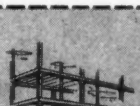
☐ Please send me literature on Koppers products listed below (specify which).

Name_____ Title_____

Company_____

Address_____

KOPPERS SUPPLIES MANY KINDS OF WATER-REPELLENT, CORROSION-RESISTANT COATINGS.

(1) Coal-tar pitch roofing
(2) Bitumastic Protective Coatings for pipe, structural steel 
and other metal, concrete, masonry and insulation. (3) Plastipitch Protected Metal for roofing and siding of industrial and farm buildings
(4) Coal-tar waterproofing and dampproofing.

ONLY PIERCE FUSES

have the

RUGGED TUBULAR BRIDGE

- TO MAINTAIN BLADE ALIGNMENT
- TO INCREASE FUSE LIFE

Additional exclusive features that mean better protection and lower ultimate cost are:

1. Balanced Lag Link
2. Screened Ventilation

FREE: Balanced Lag Link to inspect and test. Specify amperage, voltage.

Supply Trade News (Cont'd)

E. J. McGehee, a vice-president of the **Koppers Company,** has been assigned responsibility for the firm's wood-preserving activities throughout the western half of the United States, and **H. R. Condon,** vice-president in the Wood Preserving division, has been assigned responsibility for wood-preserving activities in the eastern half of the country, with headquarters as before at Pittsburgh, Pa.

Mr. McGehee, who has been staff sales manager, at Pittsburgh, will now make his headquarters in Chicago. He first became associated with the Koppers or-

E. J. McGehee

ganization in 1934 and since then has served in various executive positions in connection with the company's production and sale of pressure-treated timber for railroad and utility work.

Mr. Condon joined the Koppers Company in 1939, and since that time has

H. R. Condon

served in an administrative capacity in various phases of the production, sales and procurement of forest products.

Kenneth B. Covert, manager of refrigerant sales for the **Ansul Chemical Company,** with headquarters at Philadelphia, Pa., has been appointed sales manager of the Fire Extinguisher division at Marinette, Wis.

(*Continued on page* 536)

STONHARD STONTITE STOPS LEAKS INSTANTLY IN DAMS TUNNELS BASEMENTS SCALE PITS SIGNAL PITS FOUNDATIONS

Any one can STOP leaks or water seepage simply, quickly — and *permanently*—with STONHARD STONTITE. Our offer of "Satisfaction or No Charge" proves it.

Send for Complete Details

STONHARD

Building Maintenance Materials

Serving the Railroads Since 1922

811 Terminal Commerce Building

Philadelphia 8, Pa.

STONHARD COMPANY
811 Term. Com. Bldg., Phila. 8, Pa.

Send us a free copy of the folder "Stop Leaks Instantly" and details about STONTITE.

Firm .....

Mr. ..... Title .....

Address .....

City ..... Zone ..... State .....

BEALL Hi-Duty SPRING WASHERS are made especially to stand the strain of the heavy-duty rail service required by today's high-speed freight and passenger trains.

These washers are strong and tough, yet provide the necessary "springing action" required at rail joints, frogs and crossings.

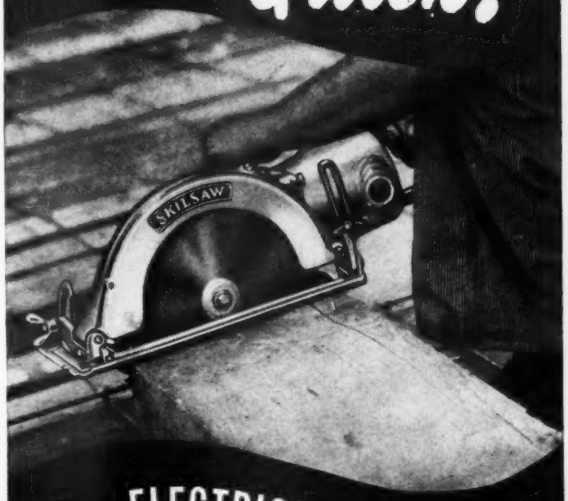
We control every step of their manufacture—from the specification of the specially-developed formula and process used in making the steel to the forming, hardening, tempering and testing operations.

BEALL TOOL DIVISION *of Hubbard & Co.*
EAST ALTON, ILL.

Specialist Manufacturers of Spring Washers

BEALL Hi-Duty
SPRING WASHERS
MADE ESPECIALLY FOR RAILROAD SERVICE

This is the Portable SAW that CUTS 8 x 16's *Quick!*

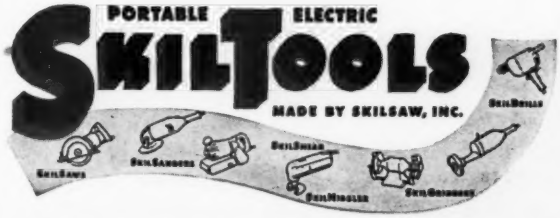


12 IN. ELECTRIC or PNEUMATIC SKILSAW!

● Either model cuts 4⅜ in. deep, rips or crosscuts 8-inch timbers in two quick cuts. Electric SKILSAW operates from power lines or portable generators on voltages up to 250 v. Pneumatic SKILSAW operates at maximum horsepower on 75 cu. ft. of free air under 80 to 100 lb. air pressure. Both SKILSAWS go right to the job, save time, labor, material handling . . . step up the output of your construction gangs. Ask your distributor today for a demonstration.

SKILSAW, INC.
5033-43 Elston Ave., Chicago 30, Ill.
Factory Branches in All Principal Cities

PORTABLE ELECTRIC
SKILTOOLS
MADE BY SKILSAW, INC.



LARGE or SMALL . . .

BURRO DOES EVERY JOB EFFICIENTLY, ECONOMICALLY

Whether the Burro is used to speed track laying or relocation, for bridge building, earth or ballast handling or on locomotive coaling jobs, it will handle every job more efficiently and economically—because Burro Cranes are built for railroad work.

Only **BURRO** *cranes have:*

- *Fast travel speeds—up to 22 M.P.H.*
- *Draw Bar Pull of 7500 lbs. (often eliminates need for work train or locomotive).*
- *Elevated Boom Heels for working over high sided gondolas.*
- *Short tail swing—will not foul adjoining track.*
- *Low overall height—Burro can be loaded and worked on a standard flat car (see illustration).*

Write for Bulletins

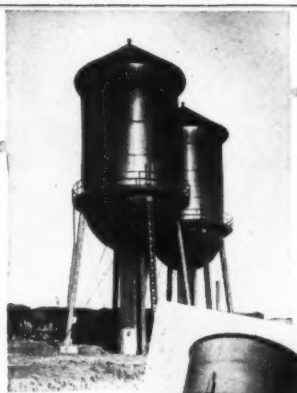
CULLEN-FRIESTEDT CO., 1301 S. Kilbourn Ave., Chicago 23, Illinois

CULLEN-FRIESTEDT CO., CHICAGO 23, ILL.

RUSTA RESTOR

1 Prevents tanks from rusting
2 Keeps tanks in continuous service (no downtime for painting)
3 Reduces tank maintenance and servicing costs

Used by more than 30 railroads



● Rusta Restor employs the basic principles of electro plating to keep tanks in a "neutral" condition that not only prevents rusting, but also removes the effects of any earlier rusting. Inexpensive to install—cheap to operate—safe. Write for fully descriptive booklet today!

RUSTA RESTOR
A DIVISION OF
THE JOHNSTON & JENNINGS COMPANY
848 ADDISON ROAD • • • CLEVELAND 14, OHIO

Supply Trade News (Cont'd)

C. C. Wiley, district sales manager of the **Link-Belt Company,** at Birmingham, Ala., has been appointed district sales manager at Baltimore, Md. He is succeeded by **James T. Bell.**

Gordon E. MacLean, who has been engaged during the past seven years in laboratory research for this company, has joined the firm's sales department, with headquarters at Indianapolis, Ind.

Thomas H. Smith, formerly with the Pennsylvania, has been appointed sales representative for the **Collins Oil & Manufacturing Co., Inc.,** and the **Walton R. Collins Company,** with headquarters at New York.

Charles H. Silsbee, manager of the Marine division, **Dearborn Chemical Company,** at New York, has been appointed assistant to the vice-president in charge of the industrial feed water sales and engineering department, with headquarters at Chicago.

Richard M. Stone, assistant manager of the export department, Tractor division, **Allis-Chalmers Manufacturing Company,** Milwaukee, Wis., has been appointed industrial sales manager, succeeding **William J. Faulkner,** who has resigned to become part owner of Frantz Tractor Company, Allis-Chalmers' New York dealer. **E. G. Kullmann,** assistant industrial sales manager, has been named assistant general sales manager.

Lyle I. Martin, formerly vice-president and chief engineer of the Morden Frog & Crossing Works, at Chicago, has been appointed assistant chief engineer of the **Ramapo Ajax Division** of the **American Brake Shoe Company,** with headquarters remaining at Chicago. **George F. Killmer,** formerly manager of sales for Morden Frog, has been appointed sales representative for Ramapo Ajax, with headquarters at Chicago. **Russell W. Martin,** formerly assistant to the manager of sales of Morden Frog, has been appointed sales representative for Ramapo Ajax Division with headquarters at Chicago Heights, Ill.

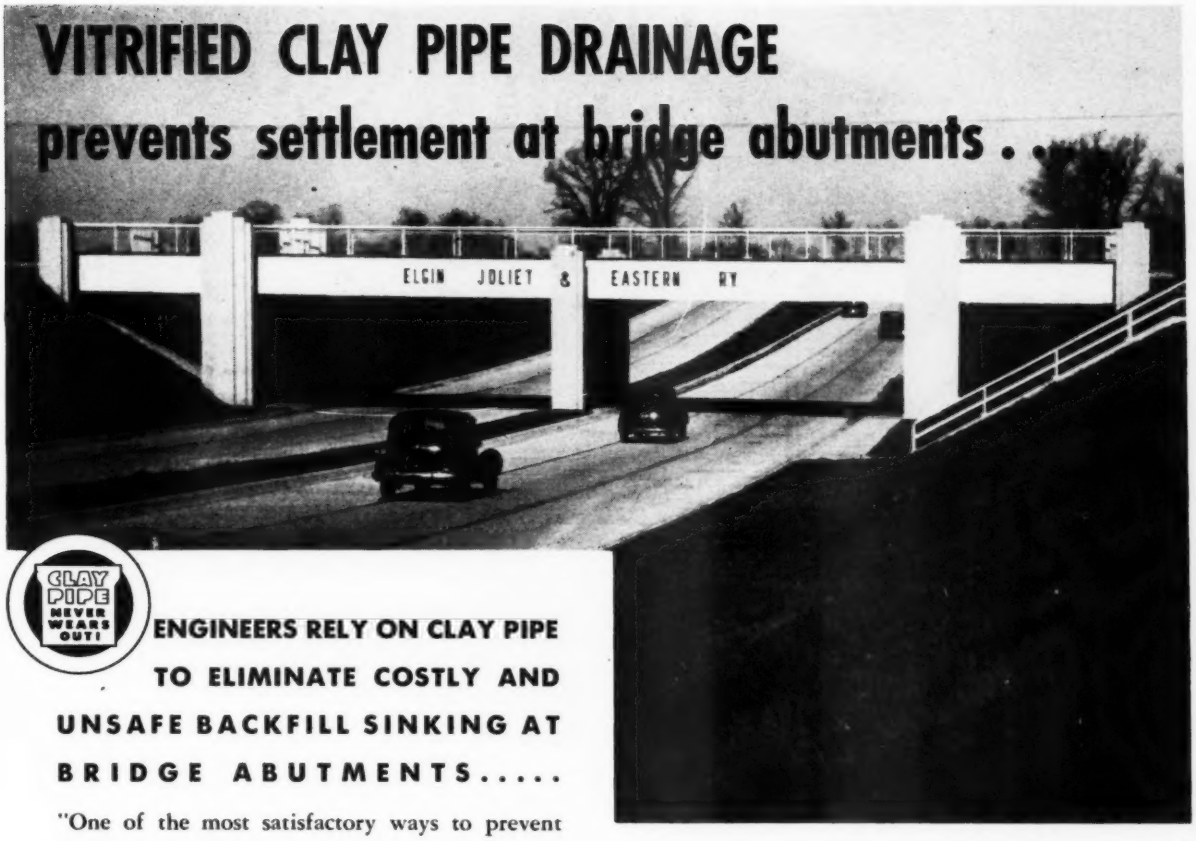
Obituary

David Hindahl, who retired in 1946 as general manager of the Rodger Ballast Car Company, at Chicago, died at the Norwegian American Hospital in that city on March 18.

Edward M. Deems, vice-president and treasurer of the Railroad Accessories Corporation, with headquarters in New York, died suddenly at his home in Forest Hills, N. Y., on April 14.

Tracy V. Buckwalter, who retired in 1945 as chief engineer and vice-president of the Timken Roller Bearing Company, died at Fort Lauderdale, Fla., on March 15. Mr. Buckwalter was 67. He became associated with the Timken Company in 1916 as chief engineer after 16 years in the Altoona, Pa., shops of the Pennsylvania. He was elected vice-president of Timken in 1925.

VITRIFIED CLAY PIPE DRAINAGE prevents settlement at bridge abutments . . .



CLAY PIPE NEVER WEARS OUT!

ENGINEERS RELY ON CLAY PIPE TO ELIMINATE COSTLY AND UNSAFE BACKFILL SINKING AT BRIDGE ABUTMENTS.....

"One of the most satisfactory ways to prevent settlement of bridge abutments on spread footings is to provide *dependable* drainage . . ." says an experienced division engineer of one of America's largest railroads.

Many of the Nation's largest railroad systems are protected with Clay Pipe drainage. Their engineers, taking advantage of Clay Pipe's economy and durability, know by resulting records of reduced track-maintenance costs that they choose wisely and well.

New Perforated Clay Pipe, properly installed, is more than a match for the constant vibration and repeated shock loads it is subjected to in railroad underdrainage. Its new perforation design features smaller holes scientifically placed to handle more ground water while reducing to a minimum entrance of soil and backfill material into the line. An unobstructed pipe invert is maintained which induces faster flow, more complete drainage.

Vitrified Clay Pipe is easily handled and installed, good for generations of service, and economical in cost. It is the finest material for railroad underdrainage obtainable.

For specific information on a Clay Pipe problem, write the details to the office nearest you.

NATIONAL CLAY PIPE MANUFACTURERS, INC.

1105 Huntington Bank Bldg., Columbus 15, Ohio
703 Ninth and Hill Bldg., Los Angeles 15, Calif.
522 First National Bank Bldg., Atlanta 3, Ga.
111 W. Washington St., Chicago 2, Ill.

C-448-2

Vitrified CLAY PIPE

APPLY BY BRUSH, DIP OR SPRAY

You Save on Maintenance Costs!

Keep cars rolling years longer . . . Provide essential protection to right-of-way equipment, bridges, buildings and other properties. Rust-Oleum coats metal . . . and dries firm—with a tough, *watertight,* enduring film that prevents rust by moisture, fumes, acids, heat and many other destructive elements.

Rust-Oleum can be applied directly to any rusting surface—after easy, time-saving preparation. *It outlasts ordinary materials two to ten times,* depending on conditions. For lasting satisfaction and extra profits specify Rust-Oleum on new and re-built cars . . . and out on the right-of-way where rust is costly.

Write for full information TODAY. Ask for Catalog No. 145.

HERE'S HOW RUST-OLEUM SAVES TIME AND MONEY:

IT GOES ON FASTER
Rust-Oleum saves 25% of the time normally required for application . . . and covers up to 30% more area.

IT CUTS PREPARATION
No sandblasting, flame cleaning or chemical rust "dissolvers" are required. Merely wirebrush to remove scale, dirt, etc. and apply RUST-OLEUM.

IT PROTECTS LONGER
Rust Oleum LASTS two to ten times longer than ordinary materials on most jobs. Every application gives maximum protection.

RUST-OLEUM CORPORATION
2417 Oakton Street Evanston, Illinois

Trade Publications

(To obtain copies of any of the publications mentioned in this column, use postcards, page 539)

Bethlehem Positive Signal Stand—The Bethlehem Steel Company has published a 16-page, illustrated booklet intended for use as a manual to assist those who have the task of installing, maintaining and operating this company's light and heavy-duty signal stands. It describes and illustrates the signal stands, with details as to use, design, operation, adjustments and types, and catalogs the parts of both the light-duty and heavy-duty models.

Roof Maintenance—The Stonhard Company has published an illustrated folder for use as a roof maintenance guide, which includes recommended uses of Stonhard plastic and liquid roof resurfacers. It describes danger signs that lead to roof failures, and cut-away illustrations are used to show the vulnerable points where special attention is most often required. The folder points out that new life and elasticity can be given to dried-out roof surfaces and explains how to stop leaks quickly and efficiently.

Lorains in Industry—This is the title of a 16-page, illustrated booklet recently published by the Thew Shovel Company. The booklet contains 46 separate photographs illustrating this company's Lorain cranes at work on many different material-handling assignments. The illustrations picture the application of both rubber-tired and crawler-mounted cranes and show the use of 15 typical attachments, such as clamshell buckets, dragline buckets, magnets, hooks, slings, tongs and others.

Michigan Shovel-Cranes on the Job—This is the title of a 16-page booklet recently published by the Michigan Power Shovel Company. It is a booklet of photographs showing all types of Michigan shovels and cranes in action on many different kinds of work. Illustrated are shovels and trench hoes engaged in excavation work; cranes in action equipped with draglines, clamshells and magnets; and cranes performing many kinds of lifting jobs. In addition the booklet presents some information about the equipment illustrated, covering mobility, air controls, design, turntable mechanisms, maintenance, and interchangeability of parts.

Booklet of Standard Designs—In a booklet recently announced by the Roberts & Schaefer Co., this company presents 27 standard designs for coaling stations, cinder handling plants and sanding plants. These designs, functionally complete in themselves, can be used as planning drawings, or they can be employed as a guide in connection with specialized requirements. Attractively bound, the designs are presented as blue-line prints of drawings, and include eight designs of reinforced concrete coaling stations, eight designs of structural steel coaling stations, five designs of cinder plants and engine coalers, and six designs of sand plants. The booklet also has one page of drawings showing mechanical equipment for coaling stations.

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

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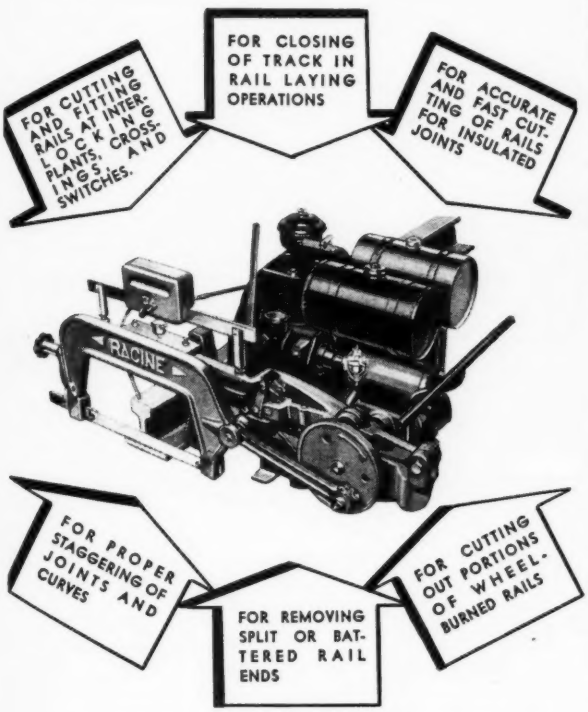
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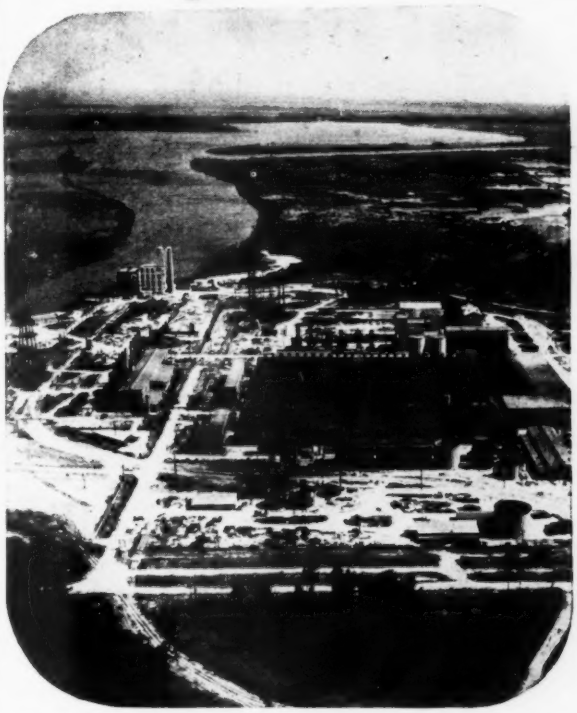

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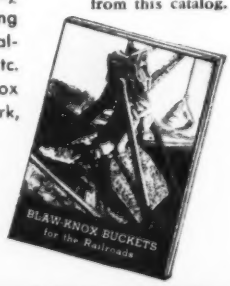

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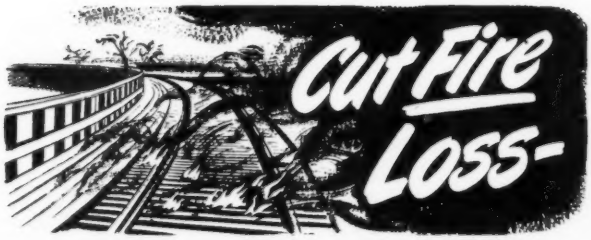

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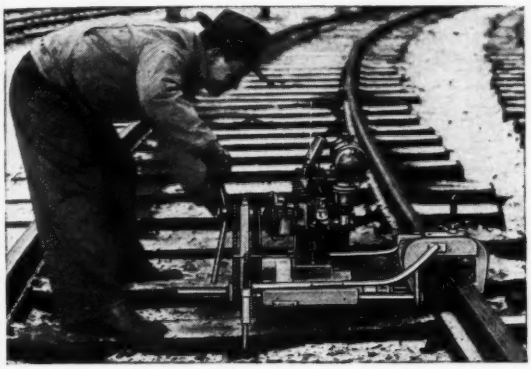

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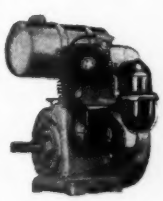

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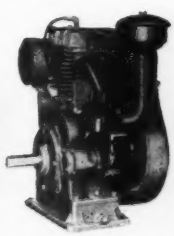

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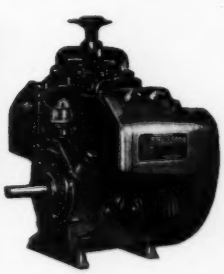

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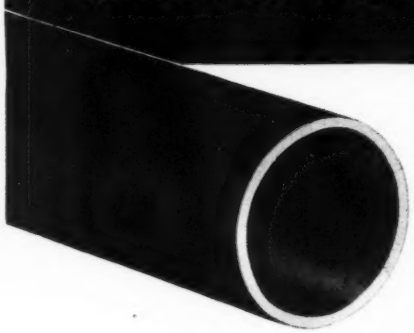

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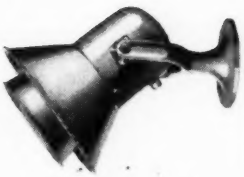

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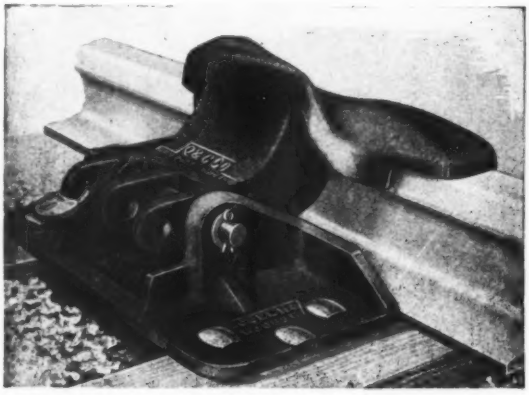
Barber-Greene
Constant Flow Equipment

Protect Main Line Traffic
By Using

Q & C Derails



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Specify Q and C Derails to insure safety and economy

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ONAN AIR-COOLED ENGINES—*CK: 2-cylinder opposed, 10 HP. BH: 2-cylinder opposed, 5.5 HP. IB: 1-cylinder, 3.25 HP.*

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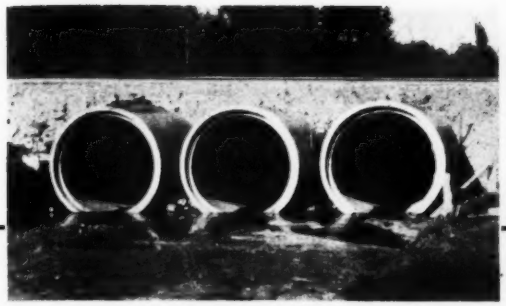

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★ **Let us tell you how to save money and time by using Universal Concrete Culvert Pipe for bridging. Universal Pipe is manufactured to meet railroad specifications. In addition to a sound, engineered appearance, Universal Pipe Bridges are quickly installed with minimum traffic tie-up and are permanent. Write for Bulletin R-E-1.**

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CONCRETE PIPE CO.
297 S. HIGH ST., COLUMBUS, OHIO

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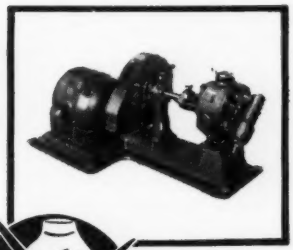

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*Reg. U. S. Pat. Off.

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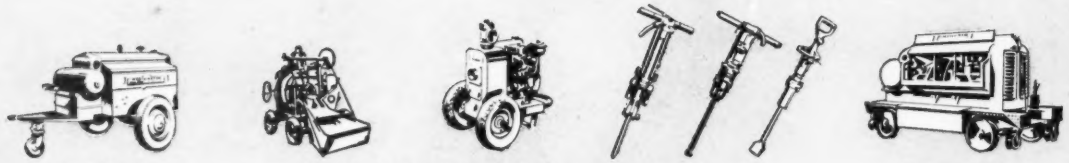

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